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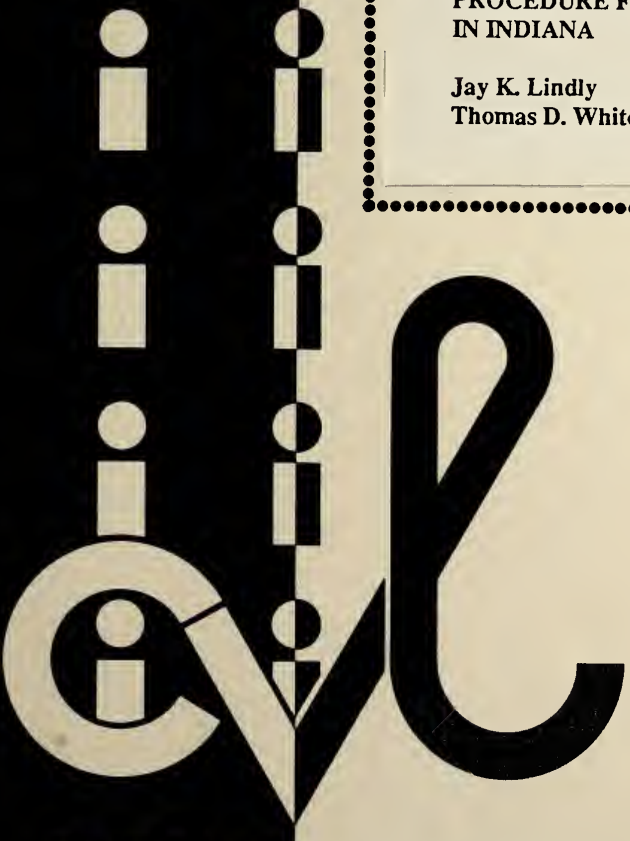
FHWA/IN/JHRP-87/9 -1

Final Report

DEVELOPMENT OF AN OVERLAY DESIGN PROCEDURE FOR FLEXIBLE PAVEMENTS IN INDIANA

Jay K. Lindly
Thomas D. White



PURDUE UNIVERSITY

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DEVELOPMENT OF AN OVERLAY DESIGN PROCEDURE FOR FLEXIBLE PAVEMENTS
IN INDIANA

Final Report

TO: H. L. Michael, Director
Joint Highway Research Project

FROM: Thomas D. White, Research Engineer
Joint Highway Research Project

October 21, 1987

Project: C-36-55G

File: 2-12-7

Attached is the Final Report on the HPR Part II study titled, "Development of an Overlay Design Procedure for Flexible Pavements in Indiana." This study presents the results of a study that evaluated nondestructive testing equipment and utilized data collected from the existing highway system to develop a proposed overlay design procedure for flexible pavements.

The overlay design procedure involves conducting a parallel analysis to determine overlay thickness required for added structural capacity or to provide functional mitigation of distress.

This report is forwarded to IDOH and FHWA in fulfillment of the objectives of the study.

Sincerely yours,

Thomas D. White

Thomas D. White
Research Engineer

TDW/rrp

cc: A.G. Altschaeffl
J.M. Bell
M.E. Cantrall
W.F. Chen
W.L. Dolch
R.L. Eskew
J.D. Fricker
D. E. Hancher
R. A. Howden
M.K. Hunter
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R.D. Miles
P.L. Owens
B.K. Partridge
G.T. Satterly
C.F. Scholer
K.C. Sinha
C.A. Venable
T.D. White
L.E. Wood

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16. Abstract

A Procedure for designing the thickness of asphaltic concrete overlays of flexible pavements was developed at Purdue University in response to a request from the Indiana Department of Highways (IDOH). The research included testing on 30 flexible pavement test sections. Two approaches to the problem were taken: an empirical approach which calculates the overlay thickness required to provide functional performance (ride quality and resistance to distress) over the life of the pavement, and a structural overlay method which calculates thickness required to prevent structural failure.

Flexible overlay design Method 2 of the 1986 AASHTO Guide for the Design of Pavement Structures was selected for structural capacity design. Method 2 uses NDT deflection data input to calculate overlay thickness. A negative value for overlay thickness indicates that sufficient structural capacity is present without adding an overlay.

The functional performance approach used Indiana flexible pavement historical data to produce a regression equation relating overlay thickness to traffic, design life of the overlay, pavement condition at the end of the design life, and estimated subgrade CBR. Various NDT deflection measurements, climate zone data, and pavement layer thickness variables were included in a variety of empirical analyses, but they were not significant in the analyses.

Simultaneous use of the two design methods was recommended to IDOH. If values from both methods are positive, the larger value governs the design. If the structural value is negative, a thickness equal to the functional performance design may be milled and recycled back to the pavement.

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DEVELOPMENT OF AN OVERLAY DESIGN PROCEDURE FOR FLEXIBLE PAVEMENTS IN INDIANA

FINAL REPORT

by

Jay K. Lindly
Graduate Research Assistant

Thomas D. White
Associate Professor of Transportation Engineering

Joint Highway Research Project

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The contents of this report reflect the views of the authors who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Purdue University
West Lafayette, Indiana

October 21, 1987

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ABSTRACT

Lindly, Jay K. Ph.D., Purdue University, August 1987. Development of an Overlay Design Procedure for Flexible Pavements in Indiana. Major Professor: Dr. Thomas D. White.

A procedure for designing the thickness of asphaltic concrete overlays of flexible pavements was developed at Purdue University in response to a request from the Indiana Department of Highways (IDOH). The research included testing on 30 flexible pavement test sections. Two approaches to the problem were taken: an empirical approach which calculates the overlay thickness required to provide functional performance (ride quality and resistance to distress) over the life of the pavement, and a structural overlay method which calculates the overlay thickness required to prevent structural failure.

Flexible overlay design Method 2 of the 1986 AASHTO Guide for the Design of Pavement Structures was selected for structural capacity design. Method 2 uses NDT deflection data input to calculate overlay thickness. A negative value for overlay thickness indicates that sufficient structural capacity is present without adding an overlay.

The functional performance approach used Indiana flexible pavement historical data to produce a regression equation relating overlay thickness to traffic, design life of the overlay, pavement condition at the end of the design life, and estimated subgrade CBR. Various NDT deflection measurements, climate zone data, and pavement layer thickness variables were included in a variety of empirical analyses, but they were not significant in the analyses.

Simultaneous use of the two design methods was recommended to IDOH. If values from both methods are positive, the larger value governs the design. If the structural value is negative, a thickness equal to the functional performance design may be milled and recycled back to the pavement. Milling and recycling recommendations for variations on the above situations were also given.

CHAPTER 1. INTRODUCTION

A survey of Federal-Aid Primary (FAP) roads in Indiana was conducted in 1985 as part of an HRP Part II study titled "Development of an Overlay Design Procedure for Pavements in Indiana". As a result of this survey, approximately 3180 lane-miles of flexible pavement (containing no portland cement concrete) were identified. That mileage is contained in 431 pavements of varying cross-sections whose lengths may range from under one-quarter mile to over 10 miles. In many cases these 431 sections have been overlaid several times. For example, almost 75 percent of the sections have been overlaid at least three times since initial construction and over 25 percent have been overlaid five or more times.

Flexible pavement overlay frequency is expected to remain high. The Indiana Department of Highways (IDOH) is currently using a 10-year design life in their overlay thickness calculations. At that expected life, over 300 lane-miles per year of FAP flexible pavements can be expected to be overlaid.

Currently, the IDOH is using an overlay thickness design based on the AASHO Interim Guide for the Design of Flexible Pavement Structures (1). A typical overlay design involves calculating several overlay thicknesses which vary depending on the magnitude of the layer coefficient assigned to the pavement layers. One recent design example provided possible overlay thicknesses ranging from 0.5 inches to 4.25 inches; the designer was required to choose the value within that range which he found appropriate.

Due to the frequency and expense of overlays and the lack of precision in its current overlay design method, IDOH funded the following reported research.

OVERVIEW OF RESEARCH

The first step in this research was to develop an inventory of all the flexible pavement sections in the FAP road system. The FAP system contains about 55% of the pavements maintained by the IDOH, including state roads, U.S. highways, and Interstates. During the inventory, the following data were stored in a computer data base for each flexible pavement section: pavement cross-section, traffic, climate zone, and overlay age. Other data such as subgrade type and layer strength data would have been excellent additions to the data base, but they were not readily obtainable at that time.

In the next step, statistical design of experiment techniques were used to select thirty, 1250 ft. long pavement test sections which were representative of the flexible pavement sections throughout the state. Each pavement section was surveyed for pavement distresses and tested with four types of non-destructive test (NDT) equipment:

1) Dynaflect. A Dynaflect and technician was made available to the research team by the IDOH Research & Training Center (R&T).

2) Road Rater 400 (RR400). A RR400 and a technician were made available by the Kentucky Transportation Research Center.

3) Road Rater 2000 (RR2000). A RR2000 and a technician were made available from the Kentucky Department of Transportation.

4) Dynatest Falling Weight Deflectometer (FWD). An FWD device was obtained on loan from the U.S. Army Corps of Engineers Waterways Experiment Station.

NDT testing was conducted twice in 1986 -- once in the spring and once in the summer/fall -- so that seasonal differences in NDT results could be analyzed. Each 1250′ long test section was tested in at least six locations within its length. Five-day temperature history and pavement surface temperature during testing was obtained for all NDT testing. In addition, cores and subgrade samples were collected from all sections and tested.

The accumulated data were analyzed both by empirical and structural capacity methods. In the empirical method, statistical analysis was applied to the data to determine "what worked", and under what conditions. In the structural capacity method, the NDT data were analyzed using the flexible pavement overlay design procedure in the 1986 AASHTO Guide for Design of Pavement Structures (1).

ORGANIZATION OF THESIS

The research described in this thesis represents one-half of an overall research effort to produce new overlay thickness design techniques for both flexible and rigid pavements in Indiana. As a consequence, much of the project planning and data gathering aspects of the two areas of the research were concurrent. The common aspects of the two research areas are described in detail in Appendix A (2), which is a previously unpublished memo by N.D. Pumphrey, Jr. and J.K. Lindly describing in detail the FAP data base development, design of experiment and field testing. Although these subjects are also treated in the main body of this thesis, they are covered in less detail. Thus, if more detail is desired, Appendix A should be consulted.

CHAPTER 2. REVIEW OF LITERATURE

Much has been written about using deflections obtained with non-destructive test (NDT) devices to design the thickness of asphaltic concrete overlays. In NDT testing, a load is applied to the surface of a pavement, and the resulting surface deflections are measured at the load and for several feet away from the load. As described by Moore, Hanson, and Hall (3) and by Smith and Lytton (4), the load can be applied to the pavement in a variety of ways:

1. Through a static loading device such as the LaCroix Deflectograph.

2. Through a steady state dynamic loading device such as the Dynaflect or Road Rater.

3. Through an impulse (impact) loading device such as the Falling Weight Deflectometer (FWD).

The same authors add that wave propagation NDT devices have also been built but are not used routinely.

Thollen (5) compares the routinely used test devices in terms of their abilities to transmit a load to the pavement which most resembles a moving wheel load. He found that the FWD´s are superior in this respect. As a group the FWD´s are also capable of supplying heavy loads (in the 9-kip range) which best resemble the load transmitted by a standard 18-kip axle load.

The major types of NDT devices have been ranked by Lytton, Roberts, and Stoffels (6) for their "total utility for project-level use" and for their "total utility for network-level use". Two FWD´s were at the top of both lists. However, all four devices used in the current research project -- the Dynatest FWD, the Dynaflect, the Road Rater 400, and the Road Rater 2000 -- were all ranked among the top six devices in both rankings.

There are two main methods of interpreting NDT deflection results to design overlay thicknesses: empirical methods and analytical (mechanistic) methods.

EMPIRICAL METHODS

Finn and Monismith (7) describe and review several empirical methods for designing asphalt overlays using NDT deflections such as the Asphalt Institute Method (8), the Transport and Road Research Laboratory (TRRL) method, and the State of California (Caltrans) method. Each of these methods use years of deflection data to determine empirical relationships between NDT deflection and the amount of future traffic that the pavement can sustain before failure. If field data shows that a pavement´s deflection is so large that it will not be able to accommodate the projected future traffic, then an overlay is required.

Figures 2.1 and 2.2 are used to demonstrate the Asphalt Institute overlay design Method. Figure 2.1 relates remaining life in 18-kip ESAL to rebound deflections using the Benkelman Beam. After consulting Figure 2.1, if an overlay is required, Figure 2.2 is used to calculate the asphalt overlay thickness that must be added to achieve a reduction in deflection. The curves in Figure 2.2 were developed using elastic-layer theory. The California Method and the TRRL Method use charts similar the Asphalt Institute which are based on experience, not elastic-layer theory.

ANALYTICALLY-BASED METHODS

Analytically-based analysis methods use NDT deflection measurements to estimate (back calculate) the moduli of elasticity of the pavement layers. In this approach, the methods employ a computer based layered-elastic analysis procedure such as Bisar (10). The computer programs perform iterative calculations to match computed surface

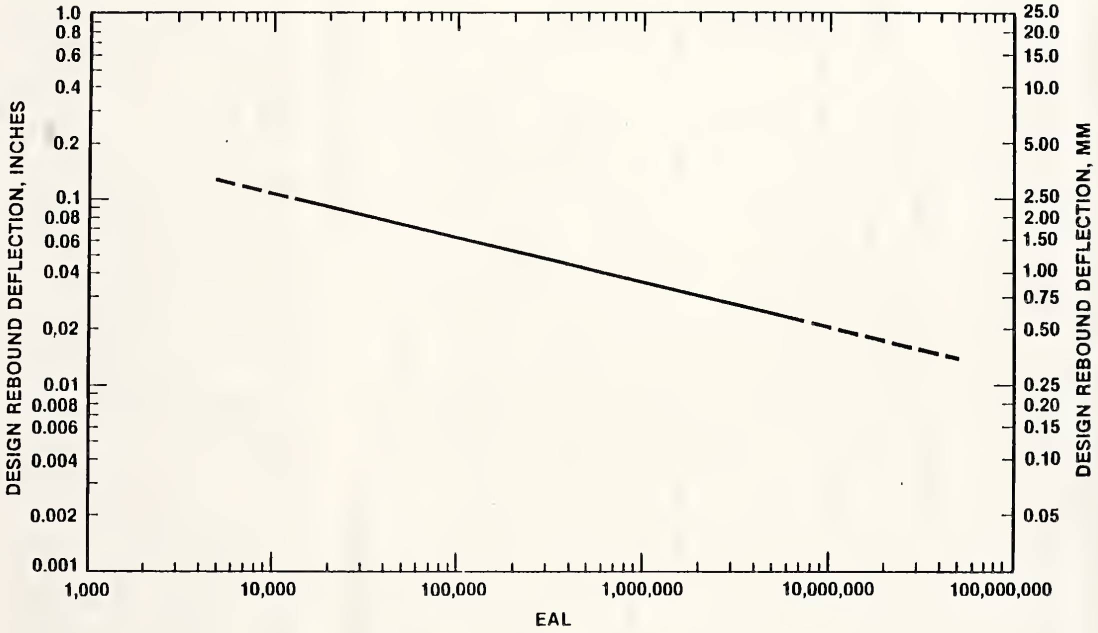


Figure 2.1 Asphalt Institute Remaining Life.

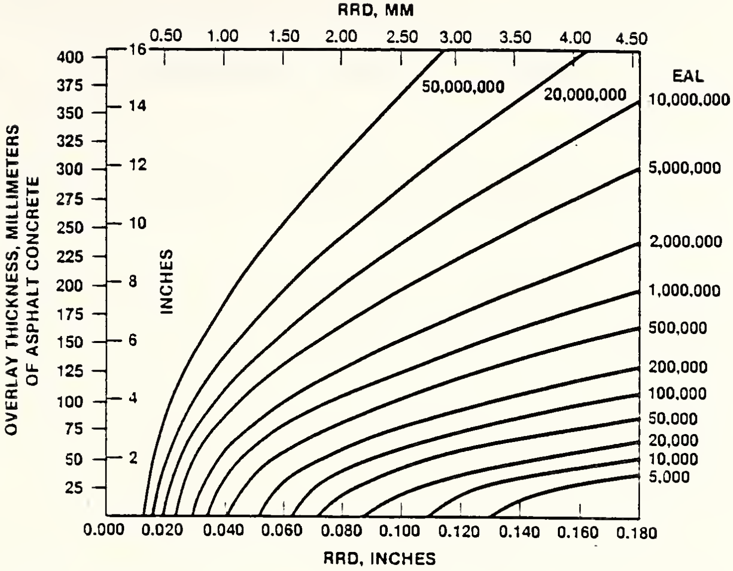


Figure IV-6—Asphalt concrete overlay thickness required to reduce pavement deflections from a measured to a design deflection value (rebound test)

Figure 2.2 Asphalt Institute Required Overlay.

deflections with NDT surface deflections measured in the field. In general, they all work in the same way:

1. Pavement layer types and thicknesses are entered
2. Magnitude and contact area of applied field load is entered
3. Surface deflections measured in field are entered
4. Initial values of moduli of elasticity are assumed
5. Poissons ratio for the layers are assumed
6. Theoretical surface deflections are calculated using input parameters and equations of mechanics
7. Differences between field deflection measurements and theoretical deflections are calculated
8. If differences are small, print moduli values and quit. If not, adjust moduli and return to step 6.

After the moduli of elasticity of the layers are estimated, the remaining pavement fatigue life is estimated from an empirical fatigue relationship. The fatigue relationship usually relates radial tensile strain at the bottom of the existing asphalt layer to the number of 18-kip ESAL at failure. Remaining life is calculated as the number of 18-kip ESAL at failure minus the number of 18-kip

ESAL that the road has already experienced. If the predicted future traffic exceeds estimated remaining life, an overlay is required. The overlay thickness is the asphalt thickness required to lower the radial tensile strain to a level which will not produce fatigue failure under the predicted future traffic. Thus, to perform these calculations, past fatigue history and predicted future traffic of the pavement are important parameters.

Rutting failure is considered in addition to fatigue failure in many overlay design methods. An empirical relationship between the number of 18-kip ESAL which will cause unacceptable rutting and stresses and strains in the pavement layers is established. Remaining pavement life before rutting and any required overlay thickness to prevent rutting are calculated by methods analagous to the fatigue failure calculations. The larger of the rutting and fatigue overlays is then selected as the design overlay.

Two layered-elastic analytical methods are the FHWA-Austin Research Engineers (POD) Method (11,12) and the FHWA-Resource International, Inc. (OAF) Method (13). Both methods use the ELSYM5 program to compute elastic moduli. However, they differ in their approach to remaining life calculation. OAF defies convention and assumes that previous fatigue history of a pavement pavement has no bearing on remaining life. OAF calculates remaining life with the following equation:

$$N_f = 7.56 \times 10^{-12} (1/\varepsilon)^{4.68} \qquad (2.1)$$

where N_f is remaining life

ε is horizontal tensile strain at the bottom of the existing asphalt layer.

OAF does not include a rutting criteria "primarily because rutting of overlaid pavements is most often associated with unstable paving mixes."

POD employs the conventional approach to remaining life calculations as described earlier. The following fatigue relationship is used:

$$N = 9.73 \times 10^{-15} (1/\varepsilon_t)^{5.16} \qquad (2.2)$$

where N is the number of allowable 18-kip single axle load applications

ε_t is the horizontal tensile strain at the bottom of the existing asphalt layer

A regression equation based on results from the AASHO Road Test has been developed for rutting:

$$N = f(R, \sigma{'}s, \varepsilon{'}s) \pm E \qquad (2.3)$$

where: N = the number of applications of the design load

R = the allowable rut depth for design

σ's = stresses in the pavement layers

ε's = strains in the pavement layers

E = error term

However, the equation "is only valid for analyzing overlays greater than three inches" because the elastic layer computer program used in the analysis does not calculate reliable stress and strain values for thin surface layers.

In addition to layered-elastic analysis, finite element analysis methods have been used by Hoffman and Thompson (15) to back-calculate moduli of elasticity from NDT deflection basins. However, iterative use of a finite element analysis results in excessive computer time and associated expense. Alternatively regression equations were developed by Hoffmann and Thompson to approximate the results that would be obtained using an iterative process. Unfortunately, because the properties of the base course were not varied in this analysis, the results are valid only for pavements which have base courses similar to that used in the original analysis.

Objections to Analytically-Based Methods

Though analytically-based methods -- in particular, the layered-elastic methods -- are being increasingly recommended, they rely on a variety of assumptions which receive criticism. In general, each pavement layer is considered to be linear-elastic, homogeneous, and isotropic; infinite in lateral extent; and the subgrade is assumed to be semi-infinite in depth. Smith, Darter, and Lytton (17) and Uddin, Meyer, and Hudson (16) list some of the criticisms of layered-elastic methods:

1. The possibility of non uniqueness of in situ moduli (in a multi-layered pavement, several combinations of moduli can yield similar deflection basins.)

2. There can be difficulty in determining the in-place moduli of granular subgrades.

3. There can be difficulty in determining the in-place moduli of thin asphalt surfaces.

4. Most mechanistic procedures rely on empirical relationships between theoretical strain or stress and a failure criteria.

DESIGN DEFLECTIONS

Results of deflection tests will vary throughout a pavement section. If there are significant variations in deflections, the pavement should be divided into separate analysis units. In an extreme case, each analysis unit may require a different thickness of overlay. Part III of the 1986 AASHTO Guide (1) recommends that the "cumulative difference" approach be used to distinguish breakpoints between analysis units.

Within each analysis unit, there will still be variation of deflection measurements. The deflection that is selected to be representative of that analysis unit is termed the design deflection. A design deflection is obtained by specifying the percentage of deflection readings inside that analysis unit which are smaller than the design deflection. The 80th to 90th percentile is usually chosen, e.g., the Caltrans method specifies the 80th percentile, the Shell (18) method specifies the 85th percentile, and the Kentucky method (19) specifies the 90th percentile.

TEMPERATURE AND SEASONAL CORRECTIONS

Temperature has a significant effect on asphaltic cement and therefore on asphaltic concrete mixture stiffness. Deflections on flexible pavements cannot be compared unless they are adjusted to a common temperature. For this project, a procedure for temperature corrections was provided by Gupta (20). The procedure involves determining a mean asphalt pavement temperature using the method by Southgate (21). Required inputs to this method are asphalt surface temperature, 5-day temperature history, time of day of the test, and geographical location of the test section. Using the calculated mean pavement temperature factor for each section, the appropriate temperature correction factors can be taken from Appendix L of the 1986 AASHTO Guide (1).

Although pavement structural capacity is lowest during spring thaw, the period of time in which these conditions exist is short. Therefore, NDT deflections from tests conducted during the longer summer/fall seasons are often corrected to give the deflection that would be expected during the critical spring thaw period. Gupta (20) also developed seasonal corrections for deflection as part of this research project. A regression analysis was performed on deflections from the same pavement sections taken during the spring and summer periods of 1986. His work is an extension and improvement on the work begun by Metwali (22) and Mohan (23).

MODULUS CORRECTION FACTORS

Temperature adjustment factors are not applied to the input deflection values when layered-elastic theory is used to back calculate modulus of elasticity values of the asphaltic concrete portion of a pavement (7). Instead, correction factors are applied to the estimated modulus. Appendix L of the 1986 AASHTO Guide (1) supplies recommended temperature adjustment factors for asphaltic concrete modulus.

CLIMATE ZONES

Yoder et al. (24,25) established two climatic zones in Indiana -- north and south. The boundaries of the climate zones were based on the work of van Til et al. (26). They have subsequently been used in two further studies examining pavement maintenance (27,28).

SERVICEABILITY INDEX AND CONDITION INDEX

Present serviceability index (PSI) and pavement condition index (PCI) are measures of pavement serviceability performance and condition, respectively. In Indiana, PSI are obtained yearly by the Indiana Department of Highways (IDOH). Harness et al. (29) present an account of the methods of data acquisition and treatment used to arrive at the PSI values. PSI is measured on a scale of from 0 to 5. Any value above 4 indicates that the pavement retains excellent serviceability; a value below 2.5 indicates that the pavement´s serviceability is low.

Pavement condition index (PCI) is a pavement condition evaluation system developed by the US Army Corps of Engineers (30). A pavement´s PCI value reflects the type, severity, and extent extent of distress present on a pavement surface. It measures such distresses as polishing, rutting, and a variety of crack types. PCI is measured on a scale of from 0 to 100. For each distress severity and extent, a deduct value is subtracted from 100. A PCI value of 100 indicates a roadway in excellent condition; a value of 25 indicates a roadway in poor condition.

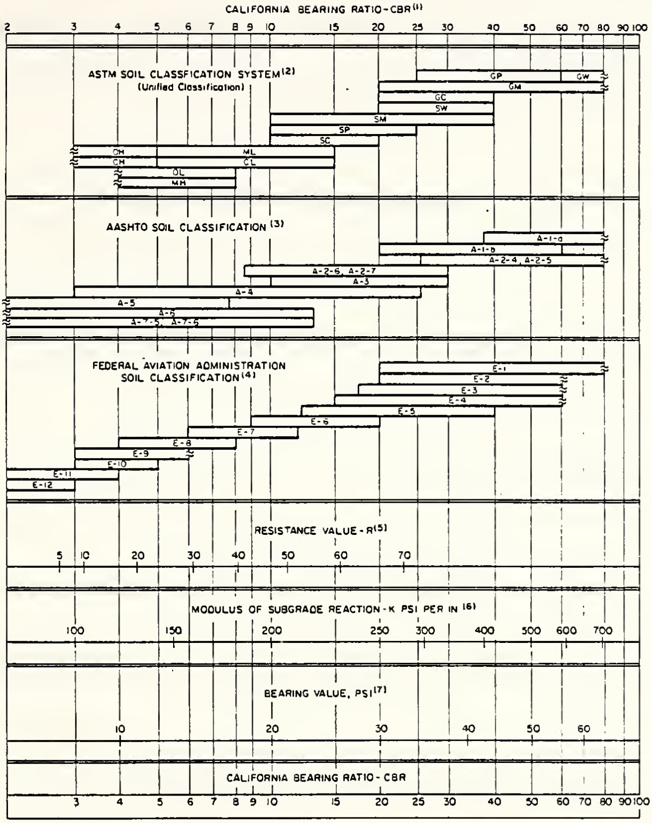
ESTIMATING CBR VALUES

The California Bearing Ratio (CBR) of a subgrade is a relative measure of the ability of that subgrade to sustain load. Methods are available for estimating a CBR value of a soil. Black has put forward techniques for estimating the CBR of cohesive (31) and cohesionless soils (32). Black's approach uses data from common laboratory tests such as the liquid limit and plastic limit tests to estimate CBR. However, the charts used in his method are limited.

The Portland Cement Association has published a chart which may be used to estimate CBR (33). In the chart, the AASHTO soil classification and Unified soil classification categories have been scaled to CBR as well as to other soil strength indices. The chart is shown in Figure 2.3.

EQUIVALENT THICKNESS

In some instances, it may be useful to characterize the combination of the asphaltic concrete and the base and/or subbase of a flexible pavement into one "equivalent thickness" of asphaltic concrete. To do so, one must assume equivalent values (in terms of inches of asphaltic concrete) for an inch thickness of base or subbase. AASHO has published equivalencies (34). Gomez and Thompson (35) have compiled a list of studies which indicates that the



(1) For the basic idea, see O. J. Porter, "Foundations for Flexible Pavements," Highway Research Board *Proceedings of the Twenty-second Annual Meeting*, 1942, Vol. 22, pages 100-138.

(2) ASTM Designation D2487.

(3) "Classification of Highway Subgrade Materials," Highway Research Board *Proceedings of the Twenty-fifth Annual Meeting*, 1945, Vol. 25, pages 376-392.

(4) *Airport Paving*, U.S. Department of Commerce, Federal Aviation Agency, May 1948, pages 11-18. Estimated using values given in FAA *Design Manual for Airport Pavements*.(Formerly used FAA Classification: Unified Classification now used.)

(5) C. E.Warnes, "Correlation Between *R* Value and *k* Value," unpublished report, Portland Cement Association, Rocky Mountain-Northwest Region, October 1971 (best-fit correlation with correction for saturation).

(6) See T. A. Middlebrooks and G. E. Bertram, "Soil Tests for Design of Runway Pavements," Highway Research Board *Proceedings of the Twenty-second Annual Meeting*, 1942, Vol. 22, paga 152.

(7) See item (6), page 184.

Figure 2.3 PCA Soils Chart.

following set of equivalencies is more accurate: 1" asphaltic concrete equals 2" base which equals 3" subbase.

CHAPTER 3. DATA

A significant volume of data was collected and developed as part of this research, and that data is presented in Appendix C. Not all of the data has been utilized, and the objective of this chapter is to present and discuss the data that was ultimately used in the analysis.

In addition to the data presented in Appendix C, Appendix B describes the locations of the 30 pavement sections tested during the research. First, a written description of each section is given. Second each section is located on individual maps of the six highway districts in Indiana.

Appendix A presents much more detailed accounts of the methods of experiment design and data collection than are given in this chapter. For instance, it presents detailed information on statistical methods used to select the 30 design sections as well as on the individual NDT devices. A list of the topics covered in Appendix A follows:

1. The process of building a data base for all flexible pavement sections in the Indiana Federal-Aid Primary (FAP) road system. The data base includes AADT,

percent trucks, and pavement cross-section data

2. Climate zones in Indiana
3. Establishing the statistical design of experiment
4. The process of selecting flexible pavement test sections
5. Field NDT testing
6. NDT devices
7. Pavement cores and soil borings
8. Pavement serviceability (PSI) and pavement condition (PCI) data
9. Independent deflection measurements

Only a brief discussion of these topics will be presented in this chapter.

DATA BASE PREPARATION

Paper records from the Planning Division of the IDOH were used to obtain data on each of the 431 distinct flexible pavement sections in the FAP highway system in Indiana. The data was used to quantify the variation in the flexible pavement system so that a statistical design for experiment could be formulated. The information about each section was also useful in the selection of the 30 test sections, as each section was required to fulfill different requirements as to layer thicknesses, climate zone location, etc. Five types of data was included in the data base:

1. Layer thicknesses
2. Current overlay ages
3. Layer material types
4. Traffic -- including AADT and percent trucks
5. Climate zone -- North or South

Other data such as subgrade type and pavement condition index would have made valuable additions to the data base, but they were unavailable at that time. These important data were obtained for the 30 test sections later in the research and used in the data analysis.

For ease of retrieval and manipulation, the five types of data which were obtained were stored in computer files with the aid of a data base manager software package (36).

DESIGN OF EXPERIMENT

Statistical design of experiment methods were used to select a set of flexible pavement test sections which were representative of the FAP system and which when tested would provide a maximum amount of useful data with a given amount of money and testing time consumed. The first part of the process was to assemble a list of the pavement characteristics which were most likely to affect overlay performance. The list follows:

1. Overlay thickness
2. Thickness of asphalt beneath the most recent overlay: hereafter called "base asphalt" thickness
3. Traffic. Trucks per day was selected as the traffic statistic with the most impact on overlay performance.
4. Climate zone location.

A design of experiment was formulated to test for the variability of those four characteristics.

The first step in designing an experiment is to establish the reference space for each of the variables. In this research, two climate zones were identified in the state (Figure 3.1). In each climate zone, a three-factor, three-level composite design was developed which contained low, medium, and high levels of all three factors. The composite design required 15 test sections in each climate zone, for a total of 30 test sections.

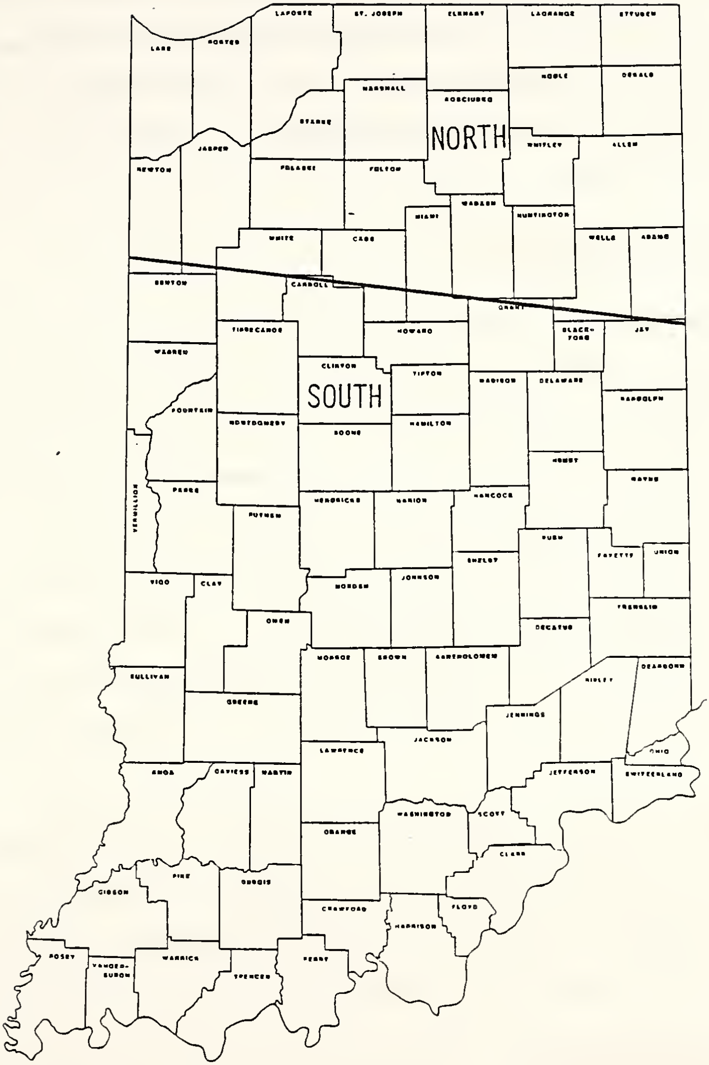


Figure 3.1 Indiana Climate Zones.

As mentioned previously, the original data base was used to identify the 30 pavement sections which satisfied the design of experiment requirements. The search of the data base was greatly facilitated by use of the data base manager software.

DATA FROM TEST SECTIONS

The design of experiment was completed in late 1985. Subsequently, plans were made to test the 30 selected flexible pavement sections. Traffic control was provided by IDOH District Offices during field testing. In addition, the Districts obtained pavement core samples from each test section. The IDOH Division of Materials and Tests agreed to take subgrade samples from each of the test sections. Roughness data and the Dynaflect NDT device and operator were obtained from the IDOH Research & Training Center (R&T).

Field testing involved conducting load-deflection tests with four different NDT test devices in both a spring and a summer/fall test period and performing condition surveys on each pavement test section.

Layer Thicknesses

The IDOH Division of Materials and Tests cored each of the 30 test sections at the third points. From these two cores, asphalt layer thicknesses and subbase layer thicknesses were determined. (Note: in this research, the term "subbase" describes all aggregate between the bituminous layer and the subgrade. Generaly, such aggregate is composed of base and, sometimes, subbase layers. However, field investigations for this research were unable to distinguish base and subbase layers, and the aggregate recovered was not of the quality generally associated with base materials. Thus, all aggregate was termed "subbase".) These thickness data are included with other information presented in Table 3.1:

1. Thickness of the most recent overlay
2. Thickness of the "base asphalt", the asphalt which underlies the most recent overlay
3. Subbase thickness
4. Pavement equivalent thickness. As described in Chapter 2, the equivalent thicknesses is calculated as the base asphalt thickness plus one-third the subbase thickness.
5. Distance from pavement surface to the subgrade or total thickness above the subgrade.

Table 3.1 Asphalt Test Section Layer Thicknesses.

Sect. No.	Overlay Thick. (in.)	Base Asphalt Thick. (in.)	Subbase Thick. (in.)	Equiv. Thick. (in.)	Distance to Subgrade (in.)
L-10	1.3	4.6	7.2	7.0	11.8
L-11	1.5	6.4	5.2	8.1	11.6
L-12	2.2	9.8	13.8	14.4	23.6
L-13	3.2	9.5	25.2	17.9	34.7
L-14	1.0	10.6	6.6	12.8	17.2
L-15	2.3	5.8	4.4	7.3	10.2
L-16	1.8	5.3	6.1	7.3	11.4
L-17	1.1	5.5	0.0	5.5	5.5
F-13	1.9	5.6	15.6	10.8	21.2
F-14	0.8	9.5	19.2	15.9	28.7
F-15	1.6	7.1	13.0	11.4	20.1
F-16	3.1	3.3	12.0	7.3	15.3
F-17	2.7	12.8	0.0	12.8	12.8
F-18	2.5	11.0	2.4	11.8	13.4
F-19	1.6	7.5	6.0	9.5	13.5
S-08	2.1	12.1	13.2	16.5	25.3
S-09	1.4	8.5	17.5	14.3	26.0
S-10	1.6	10.0	14.4	14.8	24.4
S-11	3.0	4.0	6.0	6.0	10.0
S-12	2.4	10.8	7.6	13.3	18.4
S-13	1.0	6.5	5.0	8.2	11.5
S-14	2.0	9.0	13.0	13.3	22.0
S-15	1.9	8.6	6.0	10.6	14.6
S-16	1.8	6.2	8.6	9.1	14.8
V-06	1.1	5.0	13.1	9.4	18.1
V-07	2.8	8.4	4.8	10.0	13.2
V-08	1.9	11.2	5.0	12.9	16.2
V-09	3.0	13.0	0.0	13.0	13.0
V-10	2.8	13.4	0.0	13.4	13.4
C-08	2.0	13.5	14.4	18.3	27.9

Serviceability Index and Condition Index

Two measures of pavement condition are its serviceability index and pavement condition index. The serviceability index (in units of PSI) was provided by the IDOH R&T from yearly pavement roughness surveys. In that survey, a regression equation is applied to roughness as measured by the Cox PCA roadmeter to arrive at PSI values. The roughness value is essentially a measure of the number and size of bumps experienced by an automobile passenger traveling over a length of road. The pavement condition index (PCI) was measured by the NDT crew during the summer/fall test period. As previously discussed in Chapter 2, PCI measures type, severity, and extent of pavement surface distresses such as rutting, polishing, various types of cracking, etc.

The roughness test data is automatically recorded by a test vehicle moving over the pavement at 50 mph, while the condition survey data is obtained by men on foot who may cover as little as 150 lineal feet of pavement in one-half hour. Thus, the PCI gives a more detailed, and thus perhaps better, description of the condition of the pavement.

PSI and PCI values for the test sections are presented in Table 3.2, and complete condition survey forms for each of the 30 test sections are presented in Appendix D. PCI

Table 3.2 Road Condition Data.

Sect. No.	PSI	PCI	PCI Minus: Edge Cracks, Edge Drop, Bleeding, Polishing	PCI Minus: Edge Cracks, Edge Drop, Bleeding, Polishing, Rutting
L-10	2.2	34	43	77
L-11	2.4	--	--	--
L-12	3.3	89	97	97
L-13	2.6	--	--	--
L-14	2.7	52	55	69
L-15	2.3	67	69	69
L-16	2.3	38	43	67
L-17	3.0	84	88	88
F-13	2.5	64	65	77
F-14	3.5	68	81	81
F-15	2.9	--	--	--
F-16	2.6	39	37	77
F-17	2.8	80	80	80
F-18	3.0	44	47	63
F-19	3.1	--	--	--
S-08	5.0	90	100	100
S-09	3.6	60	71	71
S-10	2.95	70	70	84
S-11	3.2	80	80	80
S-12	3.55	91	94	94
S-13	3.0	68	68	82
S-14	3.4	38	38	57
S-15	3.2	78	82	82
S-16	2.4	70	73	84
V-06	2.9	57	58	70
V-07	2.65	52	52	81
V-08	3.2	77	83	83
V-09	3.2	58	60	85
V-10	3.15	59	59	100
C-08	3.6	94	94	94

and PSI both gives measures of pavement condition, but they do not measure the same physical phenomena to arrive at their respective values. The last two columns of Table 3.2 present PCI values which do not include deductions for distresses that may not be recorded by the Cox PCA roadmeter. These values will be used in a later analysis to attempt to find a correlation between PSI and PCI.

In Table 3.2, PCI values for four of the test sections are missing. This is because surface treatments had been recently applied to those four pavements, covering the distresses which would have been recorded in the pavement condition survey.

Alligator Cracking

The PCI survey measures alligator cracking, which is a distress indicator of structural failure in flexible pavements. Only one test section exhibited more than isolated alligator cracking: 8.3 percent of the pavement surface area of section S-14 exhibits medium severity alligator cracking.

Subgrade Investigations

The IDOH Division of Materials and Tests obtained one sample of subgrade material in each of the 1250-foot long test sections. After coring through the asphalt layers and the the subbase, four feet of 3-inch diameter shelby tube was pushed. The subgrade samples were tested by AASHTO standards for liquid limit, plastic limit, density, moisture content, and particle size distribution. From this data, the subgrades were classified by the AASHTO and Unified soil classification systems.

Provisions were not made in the current research for in-place CBR tests or further laboratory studies of the subgrade soils. However, at least a good estimate of the subgrade strength was desired for the analysis. An estimate of CBR was made by using the AASHTO classification, Unified classification, and plasticity index (PI) of the soils. For each subgrade, CBR ranges for the two classifications were read from Figure 2.3. A CBR was selected that fell within both ranges. When two or more soils shared the same classifications, the soil with the lower PI was assigned the higher CBR.

For example, the subgrades for sections F-15, F-16, and F-17 are all A-6 and CL. The PI´s are 13.2, 15.2, and 19.7, respectively. CBR ranges from Figure 2.3 for A-6 and CL are 1-13 and 5-15, respectively. Thus, the assigned CBR´s must lie between 5 and 13. CBR values of 11 were selected for F-15 and F-16 because their PI values are similar. F-17 was assigned a CBR of 10 due to its relatively higher PI. The test results, soils classifications, and final estimates of CBR value are given in Table 3.3.

Traffic

The IDOH Division of Planning provided two-way average annual daily traffic (AADT) data for each of the 30 test sections. From Sharaf´s work (27), the percentage of the AADT which was composed of trucks of more than two axles was obtained. These two values were multiplied together to arrive at values for trucks per day.

The most recent overlay age of the 30 sections was defined as 1986 minus the year in which the most recent overlay was constructed. A value for "total trucks" was calculated which multiplied trucks per day by 365 and then by the age of the overlay in years, then divided by 365,000. The division by 365,000 was included so that the "total trucks" values would be in the same order of magnitude as the other input values such as layer thicknesses, CBR, etc. which was important later during regression analysis.

Traffic values for each test section are included in Table 3.4.

NDT Deflections

Though four NDT devices were used in the pavement field testing, only 2 (the FWD and the Dynaflect) were

Table 3.3 Subgrade Data.

Sect. No.	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	AASHTO Classification	UNIFIED Classification	Estimated CBR
L-10	29.0	19.6	9.4	A-4	SC	14
L-11	-	-	Not Plastic	Peat	Peat	3
L-12	21.7	14.9	6.8	A-4	SC	20
L-13	20.0	13.6	6.4	A-2-4	SM-SC	28
L-14	29.7	13.3	16.4	A-6	SC	12
L-15	-	-	Not Plastic	A-3	SP	18
L-16	-	-	Not Plastic	A-2-4	SM	37
L-17	-	-	Not Plastic	A-2-4	SM	37
F-13	-	-	Not Plastic	A-2-4	SM	38
F-14	42.3	20.3	22.0	A-7-6	CL	9
F-15	32.4	19.2	13.2	A-6	CL	11
F-16	30.7	15.6	15.2	A-6	CL	11
F-17	37.7	18.0	19.7	A-6	CL	10
F-18	17.1	12.7	4.5	A-4	CL-ML	13
F-19	53.2	26.0	27.2	A-7-6	CH	5
S-08	39.9	17.9	22.0	A-6	CL	9
S-09	38.2	17.2	21.0	A-6	CL	12
S-10	46.3	19.3	27.0	A-7-6	CL	7
S-11	58.6	20.0	38.6	A-7-6	CH	5
S-12	31.7	20.8	10.9	A-6	CL	12
S-13	31.0	19.5	11.5	A-2-6	SC	18
S-14	41.3	19.2	22.1	A-7-6	CL	9
S-15	23.7	16.2	7.5	A-4	CL	12
S-16	29.4	14.8	14.6	A-6	CL	10
V-06	35.8	19.1	16.7	A-6	CL	10
V-07	23.8	15.6	8.2	A-4	SC	16
V-08	54.5	24.1	30.4	A-7-6	CH	5
V-09	41.5	19.9	21.6	A-7-6	CL	9
V-10	23.6	15.0	8.6	A-4	CL	12
C-08	40.8	17.8	23.0	A-7-6	CL	9

Table 3.4 Traffic Data.

Sect. No.	AADT	Per-cent Trucks	Trucks Per Day	Over-lay Age (yr.)	Total Trucks $\frac{\frac{\text{Trk}}{\text{Day}}(\text{Age})(365)}{365{,}000}$
L-10	2490	16.0	398	13	18.87
L-11	2770	16.0	443	13	21.02
L-12	10060	13.0	1962	1	7.15
L-13	2510	23.0	577	6	12.63
L-14	3430	20.0	686	4	10.00
L-15	1190	16.5	196	6	4.31
L-16	4110	21.0	863	17	53.66
L-17	3200	21.0	672	3	7.37
F-13	1750	25.0	438	15	23.98
F-14	6000	27.5	1650	5	30.11
F-15	7430	27.5	2043	10	74.57
F-16	2196	25.0	549	22	44.09
F-17	8900	27.5	2448	8	71.47
F-18	9510	22.0	2013	11	80.81
F-19	2560	27.5	704	8	20.55
S-08	4100	8.0	328	1	1.20
S-09	2280	10.0	228	10	8.32
S-10	2800	12.5	350	7	8.94
S-11	4080	10.0	420	8	12.26
S-12	5420	11.5	623	6	13.65
S-13	7830	8.0	626	10	22.85
S-14	2190	8.0	175	8	5.11
S-15	910	11.5	105	7	2.70
S-16	1610	11.0	177	9	5.80
V-06	5800	19.5	1131	7	28.91
V-07	10200	19.5	1989	13	94.53
V-08	1850	11.5	213	13	10.11
V-09	7910	37.0	2927	11	117.53
V-10	7870	32.0	2755	10	100.56
C-08	6040	17.0	1027	4	15.00

considered in the data analysis. The Road Rater 400 data and the Road Rater 2000 data were both eliminated from consideration because of incomplete data sets. The Road Raters had been fitted with a new data collection system only one day before the spring test period began and did not function properly, resulting in garbled data records. Because the data was collected on tape, the garbled data was not discovered until after spring testing was complete and the data had been transferred onto paper for analysis. This problem was corrected before the summer/fall test period.

The garbled data appeared extensively throughout the spring data of which an example may be found in Appendix C. In the first test section, C8, under the Road Rater 400 heading, the last 4 values on the first line of data are the deflection readings at 0′, 1′, 2′, and 3′ away from the load. These deflection values should decrease because the pavement deflection decreases with distance from the applied load. Instead, the values follow no pattern and cannot be used in analysis.

The Road Rater 2000 data set was also incomplete for the summer/fall testing period due to its availability for only one-half the test period. Thus, instead of having four complete sets of data -- spring data and summer/fall data for each of two different Road Raters -- only the summer/fall test period for the Road Rater 400 is complete.

The deflection data directly beneath the NDT load is presented in Table 3.5. The deflection values are corrected as described in Chapter 2 to a standard 70 degrees F, and represent the 85th percentile of six deflection readings taken per test section. The six test sites per section were located 120´-180´ apart within the 1250´-long test sections. Deflections were measured in the right wheel path of the outside lane. Tables 3.6 and 3.7 present uncorrected deflection data from sensors which are farthest from the applied load for the Dynaflect and FWD, respectively.

Table 3.5 Temperature Corrected Sensor 0 Deflections.

Sect. No.	Spring Dynaflect	Summer Dynaflect	Spring FWD per 1000#	Summer FWD per 1000#
L-10	2.05	1.23	4.44	3.49
L-11	5.05	3.10	6.39	5.74
L-12	0.84	0.59	1.36	1.29
L-13	0.85	0.64	1.34	1.43
L-14	1.24	0.78	2.04	1.93
L-15	2.22	1.22	4.50	3.05
L-16	1.72	1.12	3.91	3.29
L-17	1.10	0.70	2.20	1.89
F-13	1.27	0.84	3.20	2.73
F-14	1.11	0.75	2.10	1.72
F-15	1.15	0.83	2.18	1.71
F-16	1.31	0.83	3.26	2.48
F-17	0.63	0.50	0.80	0.79
F-18	0.56	0.44	0.73	0.82
F-19	1.24	0.74	2.69	2.01
S-08	0.66	0.58	1.28	1.14
S-09	1.07	0.60	1.74	1.59
S-10	0.90	0.78	1.63	2.27
S-11	0.55	0.32	0.51	0.56
S-12	0.78	0.48	1.25	1.12
S-13	1.23	0.73	2.29	1.95
S-14	1.20	0.94	2.16	2.29
S-15	1.27	0.72	2.76	2.06
S-16	1.26	0.83	2.27	2.19
V-06	1.08	0.59	1.67	1.68
V-07	1.12	0.90	1.18	2.11
V-08	1.41	1.08	2.38	2.19
V-09	0.52	0.42	0.55	0.83
V-10	0.58	0.43	0.47	0.78
C-08	0.76	0.62	1.01	1.25

Table 3.6 Dynaflect Deflections (mils)
4 ft. from Load.

Sect. No.	Spring	Summer/Fall
L-10	0.4546	0.2927
L-11	1.7839	1.6360
L-12	0.2774	0.2518
L-13	0.2153	0.1537
L-14	0.2991	0.2385
L-15	0.4018	0.2917
L-16	0.2683	0.2050
L-17	0.1893	0.1465
F-13	0.1690	0.1490
F-14	0.2850	0.2490
F-15	0.2660	0.2310
F-16	0.1772	0.1405
F-17	0.2509	0.2081
F-18	0.1802	0.1305
F-19	0.2736	0.2375
S-08	0.2166	0.2070
S-09	0.1838	0.1478
S-10	0.1374	0.1208
S-11	0.1987	0.1714
S-12	0.2132	0.1853
S-13	0.2039	0.1693
S-14	0.2259	0.1961
S-15	0.2854	0.1915
S-16	0.2589	0.2191
V-06	0.1663	0.1679
V-07	0.2703	0.2603
V-08	0.3912	0.3265
V-09	0.2178	0.1686
V-10	0.3087	0.3002
C-08	0.1701	0.1446

Table 3.7 FWD Deflections (mils/K-lb)
7 ft. from Load.

Sect. No.	Spring	Summer/Fall
L-10	0.223	0.180
L-11	0.176	0.482
L-12	0.147	0.153
L-13	0.131	0.103
L-14	0.210	0.137
L-15	0.241	0.204
L-16	0.182	0.167
L-17	0.101	0.109
F-13	--	0.136
F-14	0.149	0.151
F-15	0.159	0.150
F-16	0.099	0.092
F-17	0.099	0.141
F-18	0.079	0.076
F-19	0.139	0.156
S-08	0.152	0.151
S-09	--	0.132
S-10	--	0.140
S-11	--	0.103
S-12	0.086	0.161
S-13	--	0.142
S-14	--	0.156
S-15	0.166	0.170
S-16	--	0.151
V-06	0.076	0.187
V-07	0.131	0.176
V-08	0.091	0.138
V-09	0.100	0.093
V-10	0.108	0.101
C-08	--	0.116

-- measurements not taken

CHAPTER 4. EMPIRICAL DATA ANALYSIS

In this chapter, statistical analysis techniques will be used to obtain a regression relationship between most recent overlay thickness (the dependent variable) and a variety of independent variables for the 30 flexible pavement test sections studied. Such a regression relationship (equation) can be used to predict required thickness for future overlays for pavements similar to the 30 test sections. The chapter also contains tests of the regression equation to ensure that it is suitable.

Independent variables addressed in the analysis include climate zone, "base asphalt" thickness (the thickness of asphalt beneath the most recent overlay), and traffic, which are factors on which the design of experiment is based. The independent variables also included the following factors for which data was collected but which were not used to design the experiment or as a basis to select the test sections (called "covariates"):

1. Most recent overlay age (years)

2. Subbase thickness (in.)

3. Equivalent asphalt thickness of base asphalt and subbase (in.)
4. Total pavement thickness (from top of pavement to the subgrade) (in.)
5. Estimated CBR (%)
6. Maximum deflection reading (from "sensor 0" directly under the load) for both spring and summer/fall (mils)
7. Present Serviceability Index (PSI)
8. Pavement Condition Index (PCI)
9. Dynaflect deflections 4′ from load (mils)

These data have been presented in Chapter 3. There may be other variables that may also have an effect on overlay performance.

TEST FOR NORMALITY OF DATA

The first step in the statistical analysis procedure was to check that the dependent variable is normally distributed. If the dependent variable is not normally distributed, then the data must be transformed in a way that results in a normal distribution. The overlay data distribution was checked using the Shapiro-Wilk test and the hypothesis of normality was accepted at the $\alpha = 0.05$ level.

MODEL SELECTION AND ANALYSIS OF VARIANCE

In order to find out which of the independent variables would be helpful in the prediction equation, analysis of variance was conducted on a variety of models using the general linear model (PROC GLM) portion of the Statistical Analysis System (SAS) (37) statistics computer package. The analysis of variance models were composed of various combinations of the independent variables, two-factor, first-order interactions, and squared terms. Climate zone was the only indicator variable: the North climate zone was assigned a value of one and South was assigned a value of zero. In each model, independent variables were included to represent pavement thickness, overlay age, traffic, climate zone, subgrade strength, and pavement condition (either PSI or PCI). In some models, a variable from the NDT deflection testing was added, making a total of seven variables.

Including six variables resulted in a model with a total of 26 terms when squared terms and interactions were added. Seven variables resulted in a model with 34 terms. However, there were only 30 observations for pavement thickness (30 test sections). Guidelines suggest that five degrees of freedom are desired in the error term. As a result, there were too many terms to be considered in the model at one time. Thus, models with a limited number of terms were considered at one time. In the first run, Type III sum of squares were evaluated. Terms which were insignificant at the 0.25 level were discarded and replaced with remaining terms prior to re-analysis. This procedure was repeated until all terms had been tested for significance. The significant terms were then used in the subsequent statistical analysis.

Table 4.1 lists the independent variables for the analysis of variance models which were ultimately investigated.

STEPWISE REGRESSION

The significant terms from each of the analysis of variance models were separately entered in a stepwise regression procedure using the SAS package. The "maxr" option of the stepwise procedure was specified. In this procedure, the analysis first produces a regression equation containing the single term which, along with a y-intercept value, gives the maximum r-squared value possible. The second output gives an equation including the two terms (plus a y-intercept) which provide the highest r-squared value. Next, the analysis gives the best three-term model, etc., until the supply of terms input to the model

Table 4.1 Models Used in Analysis.

Variable Set No.	Dependent Variable	Independent Variables Used in the Model						
1	Olay	CBR	Tottrk	Totthk	Age	PCI	Clim	
2	Olay	CBR	Tottrk	Totthk	Age	PSI	Clim	
3	Olay	CBR	Tottrk	Totthk	Age	PCI	Clim	Sen0Spr
4	Olay	CBR	Tottrk	Totthk	Age	PSI	Clim	Sen0Sum
5	Olay	CBR	Tottrk	Depth	Age	PCI	Clim	
6	Olay	Sen4Sum	Tottrk	Totthk	Age	PCI	Clim	
7	Olay	Sen4Spr	Tottrk	Totthk	Age	PCI	Clim	

Olay : Most Recent Overlay Thickness (in.)
CBR : Estimated California Bearing Ratio of Subgrade
Tottrk: Total Trucks = $\frac{(\text{Trucks/Day})(365)(\text{Age})}{365{,}000}$ (365)

Totthk: Equiv. Pavement Thickness = Asphalt Thickness + $\frac{\text{Subbase Thickness}}{3}$ (in.)

Age : Age of Most Recent Overlay (yrs.)
PCI : Pavement Condition Index
PSI : Present Serviceablity Index
Clim : Climate Zone (South=0; North=1)
Sen0Spr: Spring Dynaflect Deflection Reading Directly Under Load (mils)
Sen0Sum: Summer Dynaflect Deflection Reading Directly Under Load (mils)
Sen4Spr: Spring Dynaflect Deflection Reading 4 Feet From Load (mils)
Sen4Sum: Summer Dynaflect Deflection Reading 4 Feet From Load (mils)

has been exhausted. Thus, if 14 terms were found to be significant in the previous analysis of variance procedure, 14 different regression equations will be produced.

From each variable set, the following method was used to select promising equations:

1. All terms in the regression equation must be significant at the 0.1 level.

2. The coefficient of determination (R-squared) value must indicate that the model is a good fit, and the adjusted R-squared value must also be high.

3. Residuals of the regression equation must be normally distributed as measured by the Shapiro-Wilk test.

4. The number of terms in the regression equation must be 10 or less.

5. Mallow´s Cp must approach the number of terms in the regression equation.

Several regression equations were promising. In each case, the promising equations included the independent variables listed in variable set one. The equations are listed in Table 4.2. Though these equations possess high R-squared values, each contains nine or ten terms in the equation in addition to the y-intercept term. This was

Table 4.2 Promising Regression Equations.

Name	Regression Equation	R^2	Adjusted R^2
A	$\text{OLAY} = -2.77 + 0.0016\ \text{TOTTRK}^2 + 0.0022\ \text{AGE}^2$ $+ 0.0009\ \text{PCI}^2 - 0.0049\ \text{CBR}^2$ $+ 0.0055\ \text{CBR*AGE} - 0.0070\ \text{TOTTHK*PCI}$ $+ 0.1293\ \text{CBR*CLIM} - 0.1002\ \text{TOTTHK*CLIM}$ $+ 0.4814\ \text{TOTTHK}$	0.85	0.76
B	$\text{OLAY} = -3.42 - 3.2714\ \text{CLIM} + 0.5247\ \text{TOTTHK}$ $+ 0.0050\ \text{TOTTRK*AGE} + 0.0032\ \text{CBR*AGE}$ $- 0.0078\ \text{TOTTHK*PCI} + 0.2350\ \text{CBR*CLIM}$ $- 0.0088\ \text{CBR}^2 + 0.0010\ \text{PCI}^2$ $+ 0.0751\ \text{AGE*CLIM} + 0.1188\ \text{CBR}$	0.91	0.85
C	$\text{OLAY} = -7.73 + 43.77\ \text{CBR} + 0.0506\ \text{TOTTRK}$ $- 1.7819\ \text{CBR*TOTTHK} + 0.8051\ \text{TOTTHK}$ $+ 0.4869\ \text{AGE} - 2.0890\ \text{CBR*AGE}$ $- 0.1148\ \text{PCI} - 0.6390\ \text{CLIM}$ $- 0.0073\ \text{TOTTHK*PCI} + 0.0018\ \text{PCI}^2$	0.85	0.75

felt to be an excessive number of terms to explain a set of observations numbering only 25 or 30.

The equations were checked using sensitivity tests which start with an overlay thickness calculation for a pavement. One design parameter is changed, leaving all other parameters constant, and a new overlay thickness is calculated. The two thicknesses are compared to ensure that the design equation has reacted reasonably to the change in the parameter. For example, if CBR is selected for change, an increase in CBR with all other parameters remaining constant should result in a thinner required overlay because the pavement now rests on a stronger foundation.

Table 4.3 presents the sensitivity analysis for Equation A from table 4.2, which is typical of the sensitivity analyses of the three equations. Examination of the analyses resulted in four findings:

1. Unreasonable overlay thicknesses are calculated. In case 2 of Table 4.3, two negative overlays are calculated although no negative overlays are found in the research data.

2. Varying equivalent thickness (TOTTHK) values always result in unreasonable changes in required overlay thickness.

Table 4.3 Sensitivity Checks of Equation A.

Case #1

CBR=8% Trk/Day=2900
PCI=35 Age=10 years
Totthk=13"

Predicted Thick. 2.85"

Sensitivity	New Thickness
Trk/Day=2200	2.27
Trk/Day=1600	1.91
Trk/Day=1000	1.66
CBR=14	3.31
CBR=20	3.42
CBR=30	2.82
Totthk=9	2.31
Tottkh=12	2.72
Tottkh=17	3.39
Clim=0	3.12
Age=13	4.07
Age=15	5.04
Age=18	6.73
PCI=50	2.65
PCI=65	2.86

Case #2

CBR=12% Trk/Day=200
PCI=35 Age=10 years
Totthk=8"

Predicted Thick. 0.42"

Sensitivity	New Thickness
Trk/Day=400	0.44
Trk/Day=700	0.49
CBR= 5	0.61
CBR= 8	0.59
CBR=17	-0.01
CBR=30	-2.28
Totthk=7	0.18
Totthk=11	1.13
Totthk=15	2.07
Clim=1	1.17
Age=13	0.77
Age=15	1.03
Age=18	1.45
PCI=50	0.74
PCI=65	1.48

Case #3

CBR=12% Trk/Day=800
PCI=35 Age=10 years
Totthk=13"

Predicted Thick. 1.94"

Sensitivity	New Thickness
Trk/Day= 200	1.49
Trk/Day= 500	2.17
Trk/Day=1500	1.57
Trk/Day=2000	1.85
CBR= 7	1.88
CBR=20	2.20
CBR=30	2.49
Totthk=6	0.99
Totthk=9	1.40
Totthk=16	2.35
Clim=0	1.70
Age=13	2.36
Age=15	2.67
Age=18	3.19
PCI=50	1.74
PCI=65	1.95

3. Varying climate zone (CLIM) produces inconsistent results. In table 4.3, the South climate zone (CLIM=0) overlay thickness is greater than the North climate zone thickness in Case 1 but lower in Cases 2 and 3.

4. Varying other variables (CBR and PCI in Cases 1 and 3 in table 4.3) sometimes produced unreasonable changes in overlay thickness. However, when this occurs, an interaction of that variable with either climate zone or equivalent thickness which causes the unreasonable response is always present in the regression equation. In Table 4.3, note the positive regression coefficient for the CBR*CLIM interaction and the negative regression coefficient for the TOTTH*PCI interaction.

Due to the findings listed above, the regression equations in Table 4.2 were rejected, and a stepwise (maxr) regression procedure with independent variables overlay age, total trucks, PCI, and CBR (omitting equivalent thickness and climate zone) was initiated. The procedure produced only two regression equations which fulfilled the requirements listed above:

$$\begin{aligned} \text{olay} = {} & 0.7014 + 0.00153(\text{tottrk})^2 \\ & + 0.00326\,(\text{age})^2 + 0.00016(\text{pci})^2 \end{aligned} \tag{4.1}$$

and

$$olay = 0.7592 + 0.00145(tottrk)^2 + 0.00379(age)^2 + 0.000162(pci)^2 - (0.000429)(cbr)^2 \quad (4.2)$$

where:

olay = calculated thickness of required, new overlay in inches

tottrk = (trucks/day)(365)(age) / 365,000

age = design life of new overlay (years)

pci = desired PCI value at the end of the design life of the new overlay

cbr = estimated subgrade CBR.

The R-squared and adjusted R-squared values for (4.1) are 0.54 and 0.47, respectively. The corresponding values for (4.2) are 0.60 and 0.52. Equation (4.2) was selected for further analysis.

Figure 4.1 shows how closely (4.2) estimated the actual overlay values measured from core samples.

A sensitivity test was performed with (4.2), and the results are presented in Table 4.4. The results show that varying any independent variable in the regression equation produces the expected change in the direction of the overlay thickness. For example, in Case #1, when trucks per day is varied from 2200 to 1600, a decrease in required

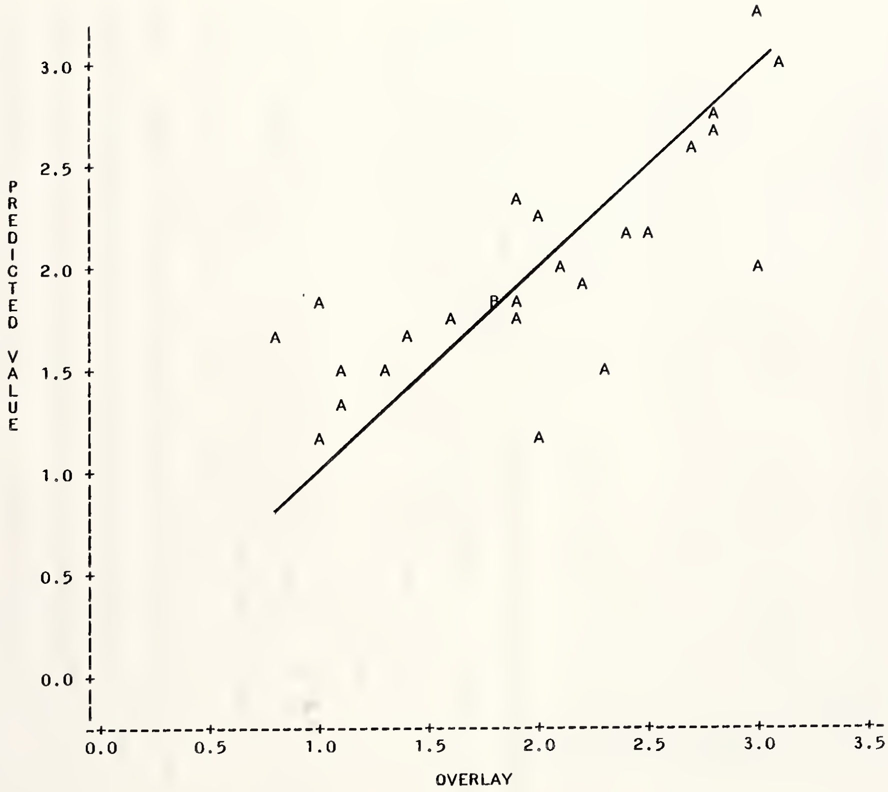


Figure 4.1 Actual vs. Predicted Overlay Thickness.

Table 4.4 Sensitivity Checks of Equation (4.2).

Case #1

CBR=8% Trk/Day=2900
PCI=35 Age=10 years

Predicted Thick. 2.53"

Sensitivity	New Thickness
Trk/Day=2200	2.01
Trk/Day=1600	1.68
Trk/Day=1000	1.45
CBR= 2	2.55
CBR=20	2.38
CBR=40	1.87
Age=13	3.63
Age=15	4.52
Age=20	7.32
PCI=50	2.73
PCI=65	3.01

Case #2

CBR=12% Trk/Day=200
PCI=35 Age=10 years

Predicted Thick. 1.28"

Sensitivity	New Thickness
Trk/Day=400	1.30
Trk/Day=700	1.35
CBR= 2	1.34
CBR= 8	1.31
CBR=20	1.17
CBR=40	0.65
Age=13	1.55
Age=15	1.76
Age=20	2.43
PCI=50	1.49
PCI=65	1.76

Case #3

CBR=12% Trk/Day=800
PCI=35 Age=10 years

Predicted Thick. 1.37"

Sensitivity	New Thickness
Trk/Day= 200	1.28
Trk/Day= 500	1.31
Trk/Day=1500	1.61
Trk/Day=2000	1.85
CBR= 2	1.43
CBR=20	1.26
CBR=40	0.74
Age=13	1.69
Age=15	1.96
Age=20	2.78
PCI=50	1.57
PCI=65	1.85

overlay thickness is expected, and the thickness does indeed decrease from 2.01 inches to 1.68 inches. These results provide a confirmation that (4.2) is a reliable regression equation. Several predicted thickness values in Case 1 exceed the typical Indiana maximum overlay thickness of three inches; these values will be addressed later in this chapter.

INDEPENDENT CHECK

As an independent check, four flexible pavement sections that were not used in the previous analysis were evaluated using (4.2). IDOH paper records were used to obtain traffic data, PCI, and overlay age for the sections. CBR was estimated based on typical soil distributions throughout the state and the proximity of the section to test sections of known subgrade type used in this study. PCI data was unavailable, so PCI was estimated from PSI. To obtain a correlation between PSI and PCI, three regression analyses were performed: the models use PSI from Table 3.2 as the dependent variable and the linear and squared terms of PCI and the two adjusted PCI´s from Table 3.2 as the independent variables. The results were poor, with the R-squared of the best correlation being 0.47 and residuals (differences between actual and predicted PSI values) of up to 1.0. Due to the poor results, a rough correlation presented in Table 4.5 was developed based on a

Table 4.5 PSI vs. PCI.

PSI	PCI
2.5	35
2.6	40
2.7	45
2.8	50
2.9	55
3.0	60
3.1	62
3.3	66
3.5	70
4.0	90
5.0	90+

Table 4.6 Independent Check of Design Equation.

No.	Trucks/ day	Age (yrs)	PCI	Est. CBR(%)	Actual O´lay (in)	Predicted O´lay (in)
1	220	8	64	12	1.7	1.6
2	790	10	64	12	1.7	1.8
3	430	10	55	10	1.0	1.6
4	2700	16	50	9	3.0	4.8

Note:

For the overlay thickness design equation, trucks/day are converted to tottrk by multiplying trucks/day by overlay age in years and by 365 days/year, then dividing the result by 365,000.

Site Locations:

No. 1: SR 135; Washington Co.; From Salem N. to the Jackson Co. line.

No. 2: SR 64; Gibson Co.; From Ill. state line, 4.32 mi. E.

No. 3: US 61; Warrick Co.; From N. city limits of Boonville to I-64.

No. 4: SR 1; Allen Co.; From 3.74 mi. N. of Allen-Wells Co. line, N. to Fort Wayne.

common sense evaluation of the values in Table 3.2 and is used in the analysis.

The independent check results are presented in Table 4.6. Actual overlays and predicted overlays using (4.2) correlate well in Numbers 1, 2, and 3. However, in Number 4, predicted overlay is thicker than the actual overlay. In fact, 4.8 inches is thicker than almost any overlay in the state. Case 1 in Table 4.4 also lists three excessively thick overlays. These examples all have high traffic and high ´age´ values, and they illustrate that values of trucks/day and overlay age which combine to exceed the maximum total truck study value of 32.2 (Table 3.4) may predict overlay thicknesses above the typical Indiana maximum of three inches. (For example, total trucks for Number 4 equals 43.2).

However, three inch maximum overlay is a limiting value for this empirical research and will be incorporated into the empirical design approach. Thus, (4.2) should be used to predict overlay thickness for total truck values under 32.2, and maximum overlay must be approximately three inches.

OVERLAY THICKNESS CALCULATIONS

Equation (4.2) was used to calculate overlay thicknesses for the 10 out of 30 pavement test sections with PSI less than 2.7 (sections at or near minimum acceptable serviceability). The calculations were based on a 10-year design life, a terminal PCI of 35 (the equivalent of a PSI of 2.5), estimated CBR values from Table 3.3, and initial truck traffic data from Table 3.4 with a two percent per year traffic growth factor. The results presented in Table 4.7 reflect expected overlay thicknesses for the input conditions. Sections F13 and V7 represent the extremes of the thickness calculations. The F13 value is less than one inch due largely to the effect of the extremely high CBR. The 2.2 inch value for V7 reflects the effect higher traffic has on equation (4.2).

RELIABILITY

The regression equation (4.2) predicts the mean of the distribution of overlay thickness. Most individual outcomes deviate from the mean, and the "reliability" concept accounts for the deviation. Reliability refers to the probability that the predicted overlay will be successful in providing acceptable service through the overlay design life. A 95% reliability indicates that, on the average, 95 times in 100 the predicted overlay will be successful. Equation (4.2) provides a 50% reliability.

Through the determination of confidence intervals, the SAS computer output for equation (4.2) provides the 95%

Table 4.7 Empirical Equation Overlay Thickness Results.

Section Number	Empirical Equation Overlay (in.)	Trucks/ Day	Estimated CBR
L-10	1.3	398	14
L-11	1.4	443	3
L-13	1.0	577	28
L-14	1.3	686	12
L-15	1.2	196	18
L-16	1.1	863	37
F-13	0.8	438	38
F-16	1.5	549	11
S-16	1.3	177	10
V-07	2.2	1989	16

reliability overlay thickness value for each of the test sections. Each value is approximately 0.9 inches thicker than the mean value calculated by (4.2), and that value must be added to any predicted thickness from (4.2) to achieve 95% reliability. Similarly, other thickness increments were calculated to reach other reliability levels, and the results are presented in Table 4.8.

Table 4.8 Thickness Increments to Reach Reliabilities.

Reliability (%)	Thickness (in.)
95	0.9
90	0.7
85	0.6
75	0.4

Use of the thickness increments in Table 4.8 would produce some overlay thicknesses which have not been verified through previous service in Indiana. For example, consider a high-traffic pavement for which equation (4.2) calculates on overlay thickness of 2.9 inches. To reach 95% reliability, 0.9 inches of overlay must be added to the 2.9 inches. The 3.8 inch total exceeds the typical maximum overlay thickness of 3.0 inches. Because the reliability-based design concept as represented by the values in Table

4.8 is untested in Indiana, its adoption cannot be recommended at this time. However, the concept is one which deserves significant further attention.

SUMMARY

Equation (4.2) is selected for empirical design:

$$\text{olay} = 0.7592 + 0.00145(\text{tottrk})^2 + 0.00379(\text{age})^2 + 0.000162(\text{pci})^2 - 0.000429(\text{cbr})^2 \qquad (4.2)$$

where:

olay = calculated thickness of required, new overlay in inches

tottrk = (trucks/day)(365)(age)/365,000

age = design life of new overlay (years)

pci = desired PCI value at the end of the design life of the new overlay

cbr = estimated subgrade CBR

Equation (4.2) has been verified for the following range of design values:

1. Anticipated overlay age: 5-20 years

2. Anticipated daily trucks: 50-3000

3. Total trucks: less than 32.2. Note: total trucks is defined as (trucks/day) (overlay age) (365)/365,000. If total trucks exceeds 32.2, the

calculated overlay value may exceed the thickest overlay typically found on Indiana pavements: 3.0 inches. If so, 3.0 inches should be specified.

4. PCI: PCI is normally specified as 35, which approximates to a PSI value of 2.5.

5. CBR: 0-40%.

If a reliability-based design is desired, Table 4.8 presents thickness values which may be added to overlay thicknesses determined from equation (4.2) to attain given reliabilities.

CHAPTER 5. STRUCTURAL ANALYSIS METHOD

This chapter describes the structural capacity overlay thickness design used in the research and presents and discusses results of structural overlay calculations for pavement test sections.

1986 AASHTO GUIDE

The structural overlay design method from the 1986 AASHTO Guide (1) was utilized, which employs the following equation as the basis for calculations:

$$SN_{OL} = SN_{Y} - SN_{XEFF}\,(F_{RL}) \qquad (5.1)$$

where:

SN_{OL} is the structural capacity of the overlay which must be added.

SN_{Y} is the total structural capacity required to support the overlay traffic over existing subgrade conditions.

SN_{XEFF} is the effective structural capacity of the existing pavement immediately prior to overlay.

F_{RL} is the remaining life factor which accounts for damage to the existing pavement as well as the desired degree of damage to the overlay at the end of the overlay traffic.

The 1986 AASHTO Guide presents two methods for solving equation (5.1). Both methods are based on NDT pavement deflections and are designed to calculate identical overlay thicknesses.

Method 1

Method 1 relies on pavement layer modulus values back-calculated from NDT deflections, from which effective structural layer coefficients are read from charts. SN_{EFF} is calculated using the layer coefficients and layer thicknesses, then SN_Y and F_{RL} are found using nomographs and figures presented in the 1986 Guide. However, the 1986 AASHTO Guide does not specify a method for determining back-calculated layer moduli.

For this research, two back-calculation methods were used to estimate layer modulus values. FWD deflection data from 30 flexible test sections tested during both the spring and summer/fall test periods were used as input to the computer program BISDEF. BISDEF is a program developed by the US Army Corps of Engineers which uses

BISAR (11) as the base program for back-calculating elastic modulus values. BISDEF includes limits on the modulus values. When a limit is reached, the modulus is fixed at that limit value. Modulus ranges for pavement layer materials follow:

1. Asphaltic concrete: 200,000 to 1,000,000 psi
2. Granular base and subbase: 15,000 to 150,000 psi
3. Subgrade: 1,000 to 50,000 psi

An alternate, unpublished back-calculation program written by a Purdue University Transportation Engineering graduate student was also evaluated. It also uses BISAR to compute surface deflections; however, the elastic modulus values are not constrained.

Tables 5.1 and 5.2 list the output elastic moduli values for the spring and summer/fall NDT testing periods, respectively. In both tables, the subgrade modulus value for a given section is almost always larger than the value for the subbase. These results cannot be accepted because they imply that the subgrade has higher structural capacity then the subbase.

The elastic modulus values for asphaltic concrete shown in Tables 5.1 and 5.2 are not temperature-corrected. Tables 5.3 and 5.4 show the modulus values corrected to a

Table 5.1 Back-Calculated E Values from Spring Testing (ksi).

Sec. No.	Bisdef			Alternate Method		
	Asphalt	Sub base	Sub grade	Asphalt	Sub base	Sub grade
C 8	396	5.0	35.4	-	-	-
F 13	200	5.0	16.1	151	7.4	20.7
F 14	203	7.2	14.9	218	7.4	24.4
F 15	352	5.0	13.5	381	4.2	23.2
F 16	265	5.0	9.4	364	3.1	16.9
F 17	522	N/A	14.8	518	N/A	20.0
F 18	1000	5.0	16.9	-	-	-
F 19	200	5.0	10.8	181	4.0	15.9
L 10	255	5.5	9.1	291	4.8	12.8
L 11	200	5.0	3.7	232	1.0	6.2
L 12	415	14.2	14.9	464	8.8	25.8
L 13	293	9.5	18.4	301	10.3	31.6
L 14	200	5.0	12.0	225	1.7	27.7
L 15	200	5.0	8.9	199	1.2	17.0
L 16	275	5.0	8.6	279	5.2	11.8
L 17	421	N/A	15.4	431	N/A	18.2
S 8	269	5.0	17.2	295	2.6	59.1
S 9	481	9.2	14.5	477	11.4	21.5
S 10	236	6.8	20.8	242	7.4	32.4
S 11	1000	150	29.2	680	15784	30.1
S 12	277	13.2	14.9	278	15.5	20.9
S 13	217	17.1	13.8	258	13.7	18.4
S 14	200	5.0	15.4	202	3.3	35.6
S 15	200	5.0	9.0	187	1.6	18.4
S 16	248	7.5	13.2	248	9.7	17.7
V 6	791	35.5	11.6	773	67.6	17.2
V 7	1000	5.0	12.5	-	-	-
V 8	200	5.0	10.1	179	1.1	27.1
V 9	669	N/A	21.8	649	N/A	29.7
V 10	1000	N/A	17.3	976	N/A	25.1

Dashes indicate computer program did not close to an acceptable solution.

Table 5.2 Back Calculated E Values from Summer/Fall Testing (ksi).

Sec. No.	Bisdef			Alternate Method		
	Asphalt	Sub base	Sub grade	Asphalt	Sub base	Sub grade
C 8	200	5.0	26.9	-	-	-
F 13	200	6.1	16.2	166	9.0	21.5
F 14	224	10.1	13.8	234	12.9	20.5
F 15	404	6.7	15.9	431	5.8	25.0
F 16	394	5.0	13.4	409	5.9	18.5
F 17	486	N/A	14.8	483	N/A	20.0
F 18	380	5.0	20.2	499	0.5	153
F 19	203	8.2	11.5	201	10.4	15.3
L 10	227	6.1	10.0	236	6.4	13.3
L 11	200	5.0	3.0	160	1.2	4.9
L 12	240	14.2	15.0	248	18.4	22.0
L 13	208	10.8	17.5	213	13.2	28.2
L 14	200	5.0	12.1	181	1.7	30.0
L 15	200	5.0	10.4	145	1.9	17.2
L 16	200	5.0	9.4	162	5.9	12.6
L 17	257	N/A	17.2	271	N/A	20.1
S 8	261	5.0	20.0	287	2.7	76.6
S 9	241	12.7	13.4	224	24.5	19.0
S 10	200	5.0	15.9	117	4.6	29.8
S 11	200	150	27.2	267	13565	27.1
S 12	201	18.0	15.9	207	19.3	23.0
S 13	207	8.8	13.6	192	17.1	17.3
S 14	200	5.0	11.7	135	3.0	27.9
S 15	200	5.0	11.5	153	3.5	18.2
S 16	200	6.3	14.1	146	23.6	16.1
V 6	649	24.4	10.8	281	124	14.5
V 7	200	5.0	8.2	-	-	-
V 8	200	5.0	9.9	58.9	3319	12.6
V 9	1000	N/A	27.2	1096	N/A	36.3
V 10	1000	N/A	25.7	1897	N/A	29.5

Dashes indicate computer program did not close to an acceptable solution.

standard 70 degrees F by the method presented in Appendix L of the 1986 AASHTO Guide, which allows the values to be compared on an equal basis. In over 50 percent of the cases, the elastic modulus values calculated from spring and summer/fall test results differ from each other by more than 50 percent. These results are also unacceptable because they indicate great changes in the asphalt layer moduli over periods of only a few months.

The results in Tables 5.3 and 5.4 may also be compared with typical values for the elastic modulus of asphaltic concrete at 70 degrees F. The Asphalt Institute (38) reports an average modulus value of about 450,000 psi at 70 degrees F. In general, the values in Tables 5.3 and 5.4 are significantly less than that value, although they range from under 100,000 to over 1,000,000 psi.

Use of method 1 was discontinued due to the lack of direction in the 1986 AASHTO Guide and problems with the back-calculated modulus results described in the previous three paragraphs.

Method 2

Method 2 requires only two NDT deflections for analysis: temperature-corrected deflection directly under load and un-corrected deflection seven feet from load. The seven foot deflection is used in the following equation to

Table 5.3 Temperature Corrected Moduli From BISDEF (ksi).

Sec. No.	Spring Correction Factor	Spring Corrected Modulus	Summer Correction Factor	Summer Corrected Modulus
L-10	0.53	135	1.21	275
L-11	0.47	94-	1.32	264-
L-12	0.44	183	1.32	317
L-13	0.75	220	1.21	252
L-14	0.80	160-	1.31	262-
L-15	0.44	88-	1.40	280-
L-16	0.50	138	1.50	300
L-17	0.50	211	1.00	257
F-13	0.93	186-	1.31	262-
F-14	0.86	175	1.23	276
F-15	0.63	222	0.91	368
F-16	1.10	292	1.23	485
F-17	0.84	438	0.93	452
F-18	0.75	750+	1.32	502
F-19	0.90	180-	1.61	327
S-08	0.93	250	1.70	444
S-09	0.39	188	1.79	431
S-10	0.64	151	1.78	356-
S-11	0.70	700+	2.02	404-
S-12	0.87	241	2.50	503
S-13	0.70	152	3.40	704
S-14	0.71	142-	3.05	610-
S-15	0.71	142-	2.86	572-
S-16	0.91	226	2.50	500-
V-06	0.56	443	1.61	1045
V-07	0.53	530+	1.50	300-
V-08	0.58	116-	1.79	358-
V-09	0.89	595	0.36	360-
V-10	1.20	1200+	0.33	330+
C-08	0.41	162	2.35	470-

- Reached lower limit in BISDEF
+ Reached upper limit in BISDEF

Table 5.4 Temperature Corrected Moduli From Alternate Method (ksi).

Sec. No.	Spring		Summer	
	Correction Factor	Corrected Modulus	Correction Factor	Corrected Modulus
L-10	0.53	154	1.21	286
L-11	0.47	109	1.32	211
L-12	0.44	204	1.32	327
L-13	0.75	226	1.21	258
L-14	0.80	180	1.31	237
L-15	0.44	88	1.40	203
L-16	0.50	140	1.50	243
L-17	0.50	216	1.00	271
F-13	0.93	140	1.31	217
F-14	0.86	187	1.23	288
F-15	0.63	240	0.91	392
F-16	1.10	400	1.23	503
F-17	0.84	435	0.93	449
F-18	0.75	-	1.32	659
F-19	0.90	163	1.61	324
S-08	0.93	274	1.70	488
S-09	0.39	186	1.79	401
S-10	0.64	155	1.78	208
S-11	0.70	476	2.02	539
S-12	0.87	242	2.50	518
S-13	0.70	181	3.40	653
S-14	0.71	143	3.05	412
S-15	0.71	133	2.86	438
S-16	0.91	226	2.50	365
V-06	0.56	433	1.61	452
V-07	0.53	-	1.50	-
V-08	0.58	104	1.79	105
V-09	0.89	578	0.36	395
V-10	1.20	1171	0.33	626
C-08	0.41	-	2.35	-

- Computer program did not close to an acceptable solution.

calculate the subgrade modulus (M) which reflects that particular test date:

$$M = P(S_F) / D_R(R) \qquad (5.2)$$

where: P is the NDT load in pounds

S_F is the subgrade modulus prediction factor given in AASHTO

D_R is the measured NDT deflection at a radial distance R (84 inches) from the center of load.

The temperature-corrected deflection directly under load is then used to solve for SN_{XEFF} using an equation of the following form given in Appendix PP of the 1986 AASHTO Guide (given here as Appendix F):

$$d = F(p, ht, ac, sn, ers, urs) \qquad (5.3)$$

where: d is temperature-corrected deflection directly under load (in.)

p is NDT load (lbs.)

ht is thickness of pavement system above the roadbed soil (in.)

ac is radius of the NDT loading plate (in.)

sn is effective structural number (termed SN_{XEFF} in equation (5.1))

ers is resilient modulus of roadbed soil (termed M in equation (5.2))

urs is Poisson´s Ratio of roadbed soil

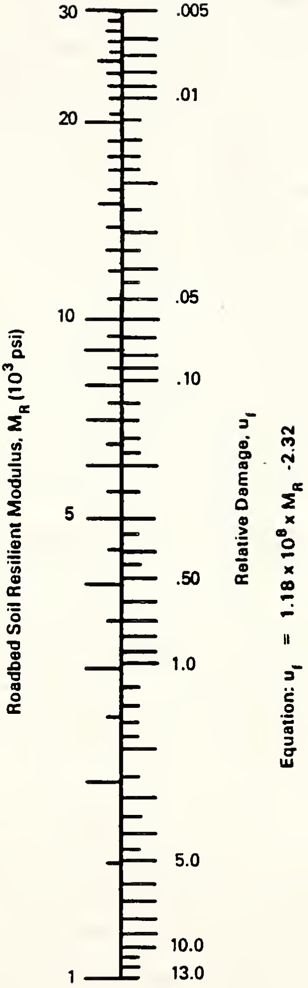
Equation (5.3) is an equation based on elastic layer theory which examines the pavement cross-section as two layers -- pavement and subgrade. SN_{XEFF} can be calculated because the subgrade modulus is already known from (5.2). SN_Y and F_{RL} are found as in Method 1, and SN_{OL} is then calculated. (A detailed description of Method 2 is found in Appendix E including a Fortran program for solving (5.3).)

A decision was made to utilize Method 2 to finish this research because the method appears to be complete. However, additional verification is required before Method 2 can be utilized with confidence.

Effective Subgrade Modulus

The effective subgrade resilient modulus (M_R) is defined as the composite modulus for all the seasons of the year, as opposed to the M of equation (5.2) which is the modulus only at a particular NDt test date. M_R is used in the nomograph solution of SN_Y. The 1986 AASHTO Guide calculates M_R using the chart presented in Figure 5.1, which requires values of M from four seasons -- spring thaw, spring/fall wet, summer, and winter. The first three values come from NDT deflections recorded in those seasons used in equation (5.2), and the winter value is estimated at 20,000 - 50,000 psi, depending upon the values from the other seasons.

Month	Roadbed Soil Modulus, M_R (psi)	Relative Damage, u_f
Jan.	28000	.006
	28000	.006
Feb.	28000	.006
	28000	.006
Mar.	20900	.012
	20900	.012
Apr.	20900	.012
	21000	.012
May	21000	.012
	21000	.012
June	22000	.010
	22000	.010
July	22000	.010
	22000	.010
Aug.	22000	.010
	22000	.010
Sept.	22000	.010
	22000	.010
Oct.	21000	.012
	21000	.012
Nov.	21000	.012
	21000	.012
Dec.	24000	.008
	28000	.006
	Summation: Σu_f =	0.238



Average: $\bar{u}_f = \frac{\Sigma u_f}{n}$ = 0.0099

Effective Roadbed Soil Resilient Modulus, M_R (psi) = 22000 (corresponds to $\bar{u}_f$)

Figure 5.1 M_R Calculation Form.

M_R calculations were performed on the test section subgrades using the FWD values from spring thaw and summer/fall testing. The spring/fall wet period modulus values were interpolated, and winter values were estimated as 20,000 - 50,000 psi. Figure 5.1 contains an example M_R calculation for section F15, and complete results are presented in Table 5.5. Note that only 15 test sections are represented. All of the test sections from Vincennes District and sections L11 and S12 were eliminated because results indicated that "spring thaw" deflection testing was performed before the subgrade had completely thawed. Eight other sections were eliminated due to lack of spring thaw deflection measurements seven feet from load.

Only the FWD could be used in the M_R analysis. It is the only NDT device used in the research equipped with a circular load plate required for calculations using equation (5.3).

The 1986 AASHTO Guide states that spring thaw moduli will be significantly lower than summer moduli. Results in Table 5.5 indicate that this may not be true in Indiana, with most spring and summer modulus values reasonably close to one another and six of fifteen spring values higher than summer values.

In many situations, only summer NDT deflections will

Table 5.5 Subgrade Moduli for Test Sections (ksi).

Sect. No.	M (Spring)	M (Summer)	M_R	M_R Minus M (Spring)	M_R Minus M (Summer)
No.	Spring	Fall		Spring	Summer
F-14	22.3	22.0	23.0	0.7	1.0
F-15	20.9	22.1	22.0	1.1	-0.1
F-16	33.5	36.1	34.0	0.5	-2.1
F-17	33.5	23.6	26.0	-7.5	2.4
F-18	43.6	45.3	45.0	1.4	-0.3
F-19	23.0	20.5	22.0	-1.0	1.5
L-10	15.3	19.0	18.5	3.2	-0.5
L-12	23.2	22.3	23.0	-0.2	0.7
L-13	26.1	33.2	30.0	3.9	-3.2
L-14	16.3	24.9	19.5	3.2	-5.4
L-15	14.7	17.3	16.0	1.3	-1.3
L-16	19.4	21.2	22.0	2.6	0.8
L-17	35.0	32.4	37.0	2.0	4.6
S-08	21.1	22.0	21.0	-0.1	-1.0
S-15	20.0	19.5	20.0	0.0	0.5
			avg.	0.74	-0.16
			σ	2.69	2.36

be available for overlay calculations. The final column in Table 5.5 shows that in that case, summer modulus values may be used as a reasonable estimate of M_R.

Table 3.5 shows that spring deflections directly under load are significantly higher than corresponding summer deflections. If spring and summer subgrade modulus values are similar in Indiana, what accounts for the higher spring deflections? It is hypothesized that Indiana spring and summer subgrade values are similar because winter frost only penetrates into the subbase, not into the subgrade, due to climate conditions or the black body effect of the asphalt surface. Thus, the subgrade may not become saturated during spring thaw while the subbase does, making the subbase the pavement layer contributing to higher spring deflections, not the subgrade. Further study is indicated to test this hypothesis.

OVERLAY THICKNESS CALCULATIONS

AASHTO Guide Method 2 was used to calculate structural overlay thickness for the 10 out of 30 pavement test sections with PSI $<$ 2.7 (sections at or near required rehabilitation). The calculations were based on the following input values:

1. Reliability that design life will be met or exceeded: 0.85 (per range provided by 1986 AASHTO Guide).

2. Standard deviation: 0.35 (per AASHTO Guide example calculations).

3. Asphalt layer coefficient: 0.34 (per IDOH)

4. Subbase layer coefficient: 0.14 (per IDOH)

5. M_R from Table 5.5, or, if not listed in Table 5.5, summer/fall subgrade resilient modulus was used.

6. Design life: 10 years (per IDOH)

7. Initial PSI: 4.5

8. Terminal PSI: 2.5

9. Traffic: 1986 base traffic with a two percent per year traffic growth factor.

Overlay calculation results are presented in Table 5.6, which shows that five out of the ten test sections (those with negative overlays) do not require additional structural overlay during the next ten years. These results are quite reasonable for the traffic levels and present asphalt thicknesses considered. Two sections (L13 and L14) already have quite thick asphalt layers but only carry average traffic. The other three sections (F13, F16, S16) have average existing asphalt thicknesses but carry low traffic. Results for four of the sections (L14, F13,

Table 5.6 AASHTO Overlay Thickness Results.

Section Number	AASHTO Overlay (in.)	Trucks/ Day	Current Total Asph. Thickness (in.)
L-10	1.6	398	5.9
L-11	5.3	443	7.9
L-13	-11.5	577	12.7
L-14	-0.2	686	11.6
L-15	1.3	196	8.1
L-16	2.1	863	7.1
F-13	-1.1	438	7.5
F-16	-0.0	549	6.4
S-16	-0.6	177	8.0
V-07	1.4	1989	11.2

F16, S16) indicate that modest reductions in asphalt thickness (0 inches to 1.2 inches) would be acceptable, suggesting that increase in pavement asphalt thickness over time has been greater than required for structural capacity. The calculation for L13 indicates that 11.5 inches of the existing 12.7 inches of asphalt could be removed. Such action should not be taken, and that value is unacceptable. However, Tables 3.1 and 3.3 show that the L13 pavement cross section is 12.7 inches of asphalt above 25 inches of subbase over a sandy subgrade (estimated CBR of 28). The asphalt thickness build-up over time on such a strong foundation does appear excessive for the relatively low traffic volume, but removal of 11.5 inches of asphalt is not indicated.

Four of the other five results in Table 5.6 indicate that moderate (1.3 inch to 2.1 inch) structural overlays are required for future traffic. The value for the fifth remaining section (L11) specifies a 5.3 inch structural overlay. Indiana experience has shown that a three inch maximum overlay is usually appropriate, so 5.3 inches is probably excessive. However, the AASHTO calculation for L11 was greatly affected by an unusual circumstance: a peat subgrade (Table 3.3). In this situation, if L11 has been performing satisfactorily with thinner previous overlays and if no alligator cracking is present, the 5.3 inch value should be discounted and replaced by a value less than three inches.

The two sections of uncommon cross-section (L13 and L11) which produced extreme overlay values demonstrate that engineering judgment and knowledge of local conditions must be used with the 1986 AASHTO Guide procedure when selecting overlay thicknesses for unusual situations.

SUMMARY

The 1986 AASHTO Guide Method 2 was selected for calculating structural overlay thickness. Method 2 uses two NDT deflections: temperature-corrected deflection directly under load and un-corrected deflection seven feet from load.

Method 2 uses the effective subgrade resilient modulus, M_R, as calculated from deflection data from four different seasons. In Indiana, if only the summer subgrade resilient modulus is known, it may be used in place of M_R. Test data indicates that seasonal change in subbase modulus be examined in future research.

Results of AASHTO Method 2 structural overlay calculations on ten pavement sections provided generally good results, though results for two pavements with unusual cross-sections required the use of engineering judgment.

CHAPTER 6. DESIGN METHOD COMPARISON AND DISCUSSION

Two methods were used in this research to determine overlay thickness requirements. One is an empirical method which results in an overlay thickness to resist surface distress (roughness) and provide rider comfort during the overlay design life. The second method is a structural overlay design method from the 1986 AASHTO Guide (1) which determines overlay thickness required to prevent structural failure during the overlay design life. AASHTO calculates a negative thickness if excess structural capacity is present.

COMPARISON

Table 6.1 compares the results of the two methods for ten pavement test sections of PSI < 2.7. The AASHTO method indicates that 5 of the 10 pavement sections require no structural overlay to meet projected future traffic. AASHTO calculates moderate structural overlay requirements for the other sections (with the exception of L11, the section with peat subgrade discussed in Chapter 5).

The empirical calculation always adds overlay thickness. Table 6.1 presents overlay thickness values between

Table 6.1 AASHTO vs. Empirical Equation Overlay Thickness Results.

Section Number	AASHTO Overlay (in.)	Empirical Equation Overlay (in.)	Trucks/ Day	Current Total Asph. Thickness (in.)
L-10	1.6	1.3	398	5.9
L-11	5.3	1.4	443	7.9
L-13	-11.5	1.0	577	12.7
L-14	-0.2	1.3	686	11.6
L-15	1.3	1.2	196	8.1
L-16	2.1	1.1	863	7.1
F-13	-1.1	0.8	438	7.5
F-16	-0.0	1.5	549	6.4
S-16	-0.6	1.3	177	8.0
V-07	1.4	2.2	1989	11.2

0.8 inches and 2.2 inches, which are within the range of overlays studied in this research.

It is not possible to directly compare results from the current IDOH structional overlay design procedure with results of the empirical and AASHTO calculations because the IDOH procedure produces three potential overlay thicknesses based on varying the percentage of remaining structural capacity assigned to the existing pavement layers in the procedure -- 70%, 80%, 100%. The designer must then choose the overlay thickness he judges most appropriate. For example, for section S16, the three potential overlay thicknesses generated are -2.9 inches, -3.6 inches, and -5.2 inches. Although the IDOH procedure results agree with the AASHTO result that the pavement does not require additional thickness, the wide range in values provides little help to the designer in accurately assessing structural capacity. This situation holds true in any calculation using the IDOH method. For that reason, IDOH calculations are not included in Table 6.1.

DISCUSSION

The empirical equation calculates an overlay thickness which provides adequate functional performance (ride quality and resistance to roughness) during the overlay design life. When pavement rehabilitation is needed, additional overlay is always added. This practice of adding overlays for functional, not structural purposes appears to have produced excess structural capacity in a significant proportion of flexible primary highway system pavements in Indiana. Three findings support this statement:

1. Only one instance of significant alligator cracking (indicating structural failure) was observed in 30 test sections (see "Alligator Cracking", Chapter 3).

2. Pavement cores from many of the 30 test sections showed thick pavements associated with relatively low traffic (see Tables 3.1 and 3.4).

3. AASHTO overlay calculations in Table 6.1 indicate that five of the ten test sections have excess structural capacity.

Use of the functional and structural design methods together will produce a more effective and economical overlay design procedure than that currently used. The functional method calculates the thickness of newly-laid overlay required for rider satisfaction. The AASHTO method calculates required additional structural capacity. If both values are positive, the larger value can be used for the overlay. If the structural value is negative, a thickness equal to the functional overlay may be milled and recycled back to the pavement as a new surface (satisfying functional performance requirements).

Milling and recycling may also be performed if the required structural overlay is positive but smaller than the functional overlay. In this case, the milled thickness is limited to the functional thickness minus the structural thickness, and an overlay must be added equal to the functional thickness.

It may also be acceptable to mill a thickness greater than the functional overlay before recycling if significant excess structural capacity exists. In this case, the recycle thickness need only be the functional thickness. Engineering judgment should be used when setting the depth of the milling operation.

Under no circumstances should a pavement requiring rehabilitation be milled without a subsequent overlay or seal. This action will expose a cracked surface to the elements and traffic. Such a pavement will deteriorate rapidly.

CHAPTER 7. CONCLUSIONS AND RECOMMENDATIONS

This research has resulted in an overlay design procedure which addresses both structural performance and functional performance (resistance to surface distress). When flexible pavements are identified for overlay, two calculations should be performed:

1. For functional performance, use equation 4.2 as described in Appendix D:

$$\text{olay} = 0.7592 + 0.00145\,(\text{tottrk})^2 + 0.00379\,(\text{age})^2 + 0.000162\,(\text{pci})^2 - 0.000429\,(\text{cbr})^2 \qquad (4.2)$$

where:

olay = calculated thickness of required, new overlay (inches)

tottrk = (trucks/day)(365)(age)/365,000

age = design life of new overlay (years)

pci = desired PCI value at the end of the design life of the new overlay (usually 35)

cbr = estimated subgrade CBR

2. For structural capacity, use 1986 AASHTO Guide

Overlay Method 2, a method which calculates overlay thickness based on NDT deflection measurements. A falling weight deflectometer (FWD) NDT device should be used to perform the NDT testing for two reasons: a) AASHTO calculations require NDT load to be applied through a circular loading plate, and b) An FWD load most closely resembles a moving truck load in both load magnitude and load duration.

Both calculations should be considered in overlay thickness selection:

1. If both values are positive, the larger may be specified as the design thickness.

2. If the structural value is negative, a thickness equal to the functional overlay may be milled and an overlay applied or the milled material recycled back to the pavement.

3. Increased milling may be considered if significant excess structural capacity exists. In this case, an overlay equal to the functional requirement thickness should be applied to the pavement and may include recycling.

4. Milling may also be performed if the required structural overlay is positive but smaller than the

functional overlay. The milled thickness will be limited to the functional thickness minus the structural thickness, and an overlay equal to the functional thickness must be added.

During the course of the project, three areas were identified for further research:

1. A need exists to develop a reliable computer program to back-calculate pavement layer elastic moduli from NDT deflections.

2. Due to the significance of subgrade characteristics, better and more detailed assessments of subgrade strength are required.

3. An investigation to determine the effect of subbase layers weakened by spring thaw moisture saturation on pavement structural capacity must be undertaken.

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APPENDICES

APPENDIX A - DATA BASE, EXPERIMENT DESIGN AND FIELD TESTING

The Indiana Department of Highways (IDOH), through the Joint Highway Research Project (JHRP) at Purdue University, initiated a project to develop overlay design procedures for jointed reinforced concrete (JRC), continuously-reinforced concrete (CRC), and flexible pavements. The results of this study are expected to fill the IDOH's need for a standardized, practical overlay design procedure.

To collect the necessary data for developing the overlay design procedure an extensive field testing and evaluation program was planned based on statistical design of experiment concepts. A statistically based design of experiment greatly reduces the number of pavements that need to be tested while maintaining the significance of the results. Part of the testing and evaluation program involved use of several non-destructive testing (NDT) devices. The NDT devices utilized were the Dynaflect, falling-weight deflectometer (FWD), and two model of the Road Rater (RR) devices (RR400 and RR2000).

NDT testing of each pavement section selected to satisfy the design of experiment was conducted twice in 1986: once during the spring thaw when the pavement subgrade is at its weakest and once in the summer/fall. During both test periods, the 4 NDT devices tested the pavement within approximately forty minutes of each other so that results from the 4 devices could be compared on an equal basis.

Other data gathered for each pavement test section included:

1. Surface roughness
2. Distress type, extent and severity
3. Layer thickness
4. Layer age
5. Subgrade classification and estimated strength
6. Traffic
7. Climatic data

This appendix outlines the steps that were taken to design the experiment, select the test sections, and obtain the NDT results and other data for each test section.

SCOPE OF EXPERIMENT

The road and highway system in Indiana consists of

91,500+ miles of public streets and highways (1). Of this mileage, approximately 11,350 miles are maintained by the IDOH and sustain almost 60% of the vehicle miles traveled. Because of the large number of sample test sections that would be required to analyze the entire state system, it was decided to include only those highways on the Federal-aid Interstate (FAI) and Federal-aid Primary (FAP) systems. Thus, the total pavement population to be analyzed was reduced to approximately 6,200 miles of the most highly traveled highways in Indiana.

In a general review of the highway system inventory, four broad types of pavements can be identified.

1. Flexible pavements
2. Jointed reinforced concrete pavements (JRCP)
3. Continuously reinforced concrete pavements (CRCP)
4. Jointed plain concrete pavements (JPCP).

Since initial construction, most of the pavements have been overlaid one or more times with 1" to 5" of asphalt per overlay.

After studying the inventory, consideration of JPC pavements was discontinued due to the limited number of these types of pavements in the highway system. Ultimately, the overlay research focused on the following pavement types:

1. Overlaid flexible pavements
2. JRC pavements with and without overlays
3. CRC pavements with and without overlays.

DATA REQUIREMENTS

After determining the highway population to be considered in the analysis, attention was turned to the factors which most affect overlay performance. Initially, a list of possible factors was compiled. In compiling this list, particular attention was given to a similar list included in the preliminary experimental design plan for the long-term pavement performance (LTPP) area of the Strategic Highway Research Program (SHRP) (2). The general list of factors considered for both flexible and rigid pavements follows:

1. Layer thicknesses
2. Layer ages
3. Layer types
4. Traffic
5. Climate
6. Pavement roughness
7. Subgrade type
8. Pavement distress
9. Layer strength.

SYSTEM INVENTORY AND DATA BASE CONSTRUCTION

To obtain values for the pavement characteristics listed above, the Planning Division of the IDOH was consulted. The Planning Division maintains a set of paper files called Road Life Records which contains basic construction and major maintenance data for every state-maintained highway in Indiana. For each county in the state, Road Life Records contains a line-drawing of each highway along with data cards describing construction dates, construction materials, and layer thicknesses, plus information on pavement widenings, overlays, etc. Eight man-months of effort were required to convert information about the FAI and FAP systems in the Road Life Records to a computer data base. Information concerning 1747 different pavement sections was recorded. These sections range in length from several one-hundredths of a mile to 20 or 30 miles. Two additional man-months were spent entering the data for the 1747 different pavement sections into a data base resident on an IBM XT personal computer. The data was entered using a data base management software package (6) for ease of data retrieval and manipulation. Approximately 500,000 bytes of memory were required for the data base.

The Planning Division also maintains traffic data (3). In each year of a three-year cycle, annual average daily traffic (AADT) data are recorded for a different one-third of Indiana highways. Seasonal and yearly adjustment factors are applied to this data, but no adjustment is made to account for vehicles of more than two axles.

Number of trucks per day is the crucial traffic parameter for this study. To obtain trucks/day for each section of highway, Sharaf´s (4) values for percentage of total traffic which is truck traffic were multiplied by total AADT to obtain trucks/day values for each highway section.

Sharaf reported percent truck data for the thirty-one and seventeen truck count station locations on the federal-aid rural primary and the rural and urban interstate highway systems, respectively. From the truck data collected at these stations, the percent trucks was determined. This percentage is assumed to be constant for the highway system within a given county. Percent trucks for counties which did not contain count station were assumed based on counted values in adjacent counties and on counties with similar population characteristics. Figures A1 and A2 show actual values and assumed values (in parenthesis) for the rural primary and interstate systems.

Work by Colucci-Rios and Yoder (5) was used to divide the state into two major climate zones. Factors such as annual snowfall and rainfall amounts, Thornwaithe Moisture

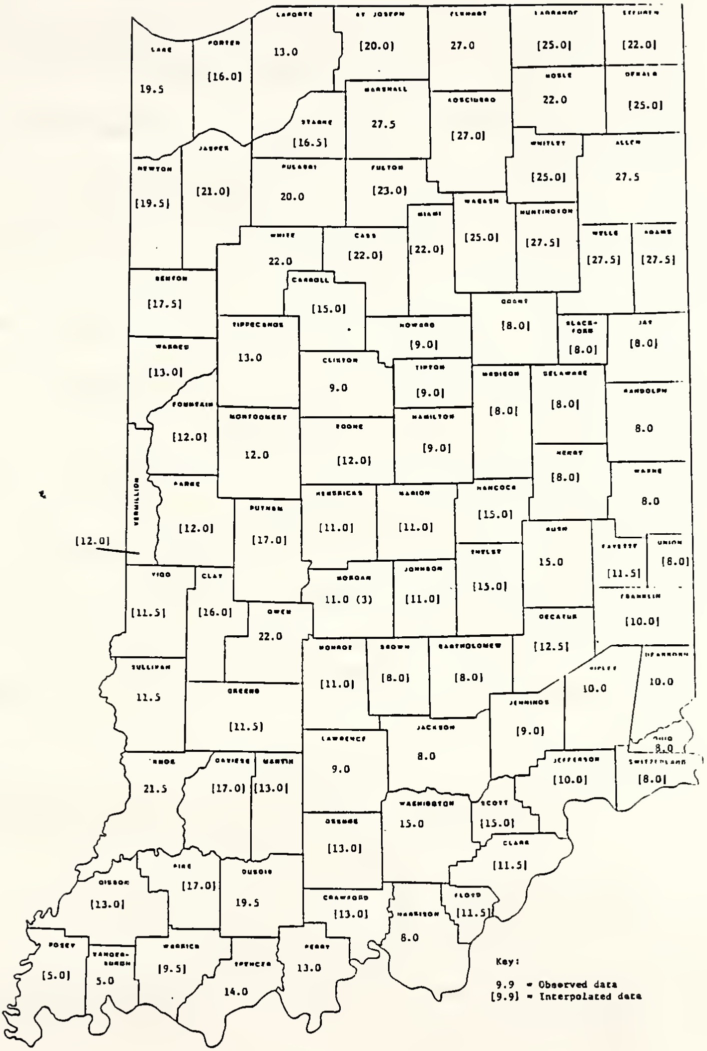
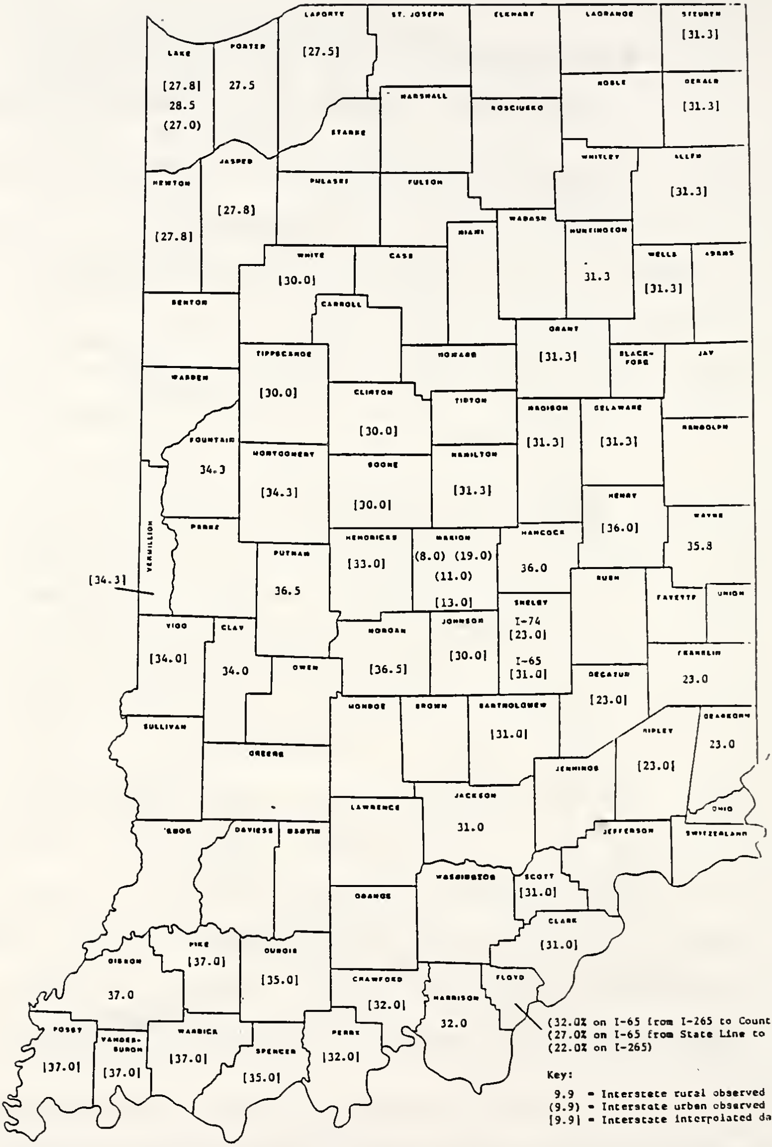


Figure A1 Percent Trucks -- Rural Primary Roads.



(32.0% on I-65 from I-265 to County Line)
(27.0% on I-65 from State Line to I-265)
(22.0% on I-265)

Key:

9.9 = Interstate rural observed data
(9.9) = Interstate urban observed data
[9.9] = Interstate interpolated data

Figure A2 Percent Trucks -- Rural and Urban Interstate.

Index, and freezing indexes were considered when establishing this dividing line between the two zones. Figure A3 shows the general climatic boundary location. In general, the boundary begins just northwest of Kentland at the Illinois/Indiana state line and proceeds as a straight line east-southeasterly to just south of Logansport, then to just north of Marion, and ending northeast of Trinity at the Ohio/Indiana state line.

Most highways in Indiana were constructed before adequate or easily-accessible records were kept concerning subgrade soil type. Lacking this information, subgrade type was not considered during data base development. Pavement distress and layer strength data were also unavailable. These data were gathered later for the pavement test sections selected.

STATISTICAL EXPERIMENT DESIGN

The primary advantage of using a statistical experiment design is that it allows one to obtain desired information about a population with relatively few samples from that population. A savings in time and finances and an increase in efficiency of the data collection procedure results when a proper experiment design is conducted.

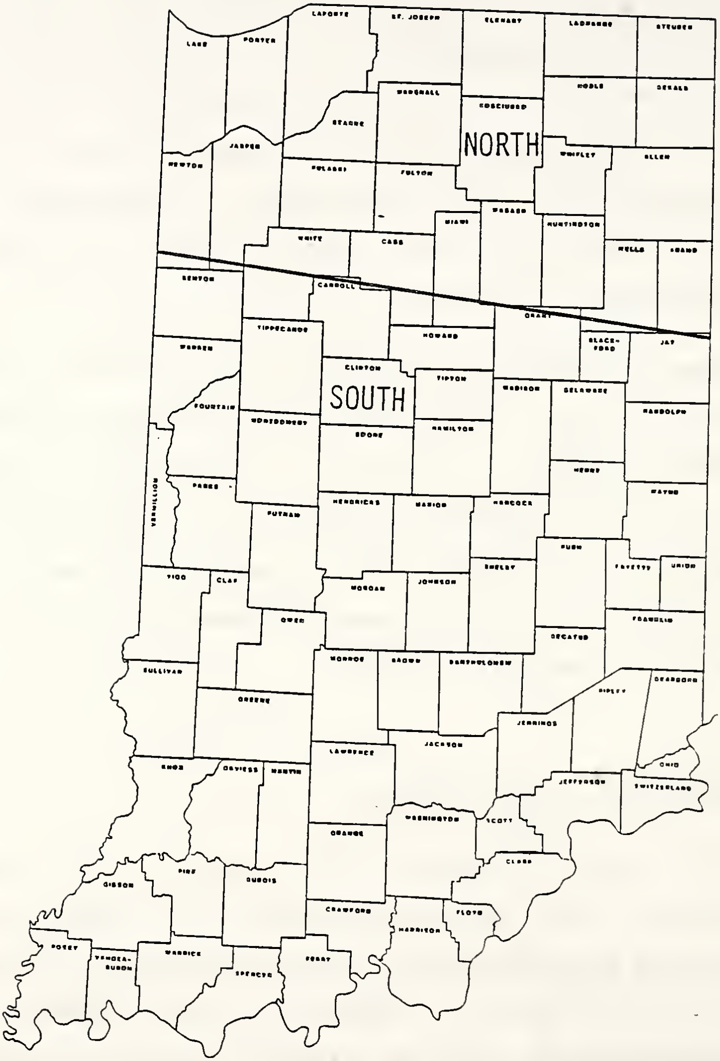


Figure A3 North and South Climate Zones.

When an experiment is designed (in this case, when the pavement test sections are selected), the size of the experiment depends upon the number of design factors considered in the experiment, the number of levels used within each factor, and the number of repeats desired. In this study, the list of factors includes layer thicknesses, traffic, and climate zone.

Levels refer to the number of levels within each factor which will be considered. For example, if AADT is chosen as a design factor, two levels of traffic would be "low" and "high". If three levels are considered, they would be the low, medium, and high levels of AADT. As either number of test factors or number of levels increases, the size of the experiment increases.

If test sections are selected based upon three of their characteristics (factors) and if each factor has two levels, the number of sections selected for a full design is 2^3 or 8. If four factors at three levels are used, 3^4 or 81 sections must be selected. In this type of experimental design, called a complete factorial, all levels of each factor are represented with all levels of each other factor.

If only two levels per factor are chosen, only linear relationships can be calculated during analysis of test data. If three levels per factor are used, curved relationships can be determined. Three levels per factor were selected so that curvature could be detected in a relationship, if present.

Because the state was broken into two climate zones, a total of six different experiments were to be designed: an experiment in each climate zone for JRCP, for CRCP, and for flexible pavements.

Another consideration was that the first field test series was to be performed during the spring thaw period when excess water can be present beneath the pavement, resulting in the pavement´s weakest condition. It was estimated that only a total of 65-70 sections could be tested during this month-long period. Thus, while three levels of each factor must be considered, only 10-12 test sites could be selected for each of the six experiments. Thus, only two factors could be used if complete factorial experiments were to be conducted. ($3^2 = 9$, which is acceptable. $3^3 = 27$, which is too high.)

The list of potential factors was scrutinized. Despite the fact that the resulting number of test sections would be too high in a complete factorial design, it was decided that three factors were required for each experiment. For flexible pavements, the following factors were chosen:

1. Traffic
2. Thickness of most recent overlay
3. Total asphalt thickness beneath most recent overlay.

For both JRCP and CRCP, the following three factors were chosen:

1. Traffic
2. Ratio of overlay thickness to total pavement thickness
3. PC concrete thickness.

Once the factors were selected, the levels of each factor for the experiment could be established. The previously-referenced data base management software was used to compile data for the plots in Figures A4-A12 for flexible, JRC, and CRC pavements. Using the information presented on these plots, the total range of each factor could be determined. Then, within the total range, values for high, medium, and low levels for that factor could be set. For example, in Figure A5, the thickness of most recent overlay of flexible pavements ranged from 0.75" to 4.75". However, almost all of the overlays were from 0.75" to 3.25" thick. This smaller range was used to set the levels of most recent asphalt overlay thickness because an insufficient number of the thicker overlay pavement was available for testing.

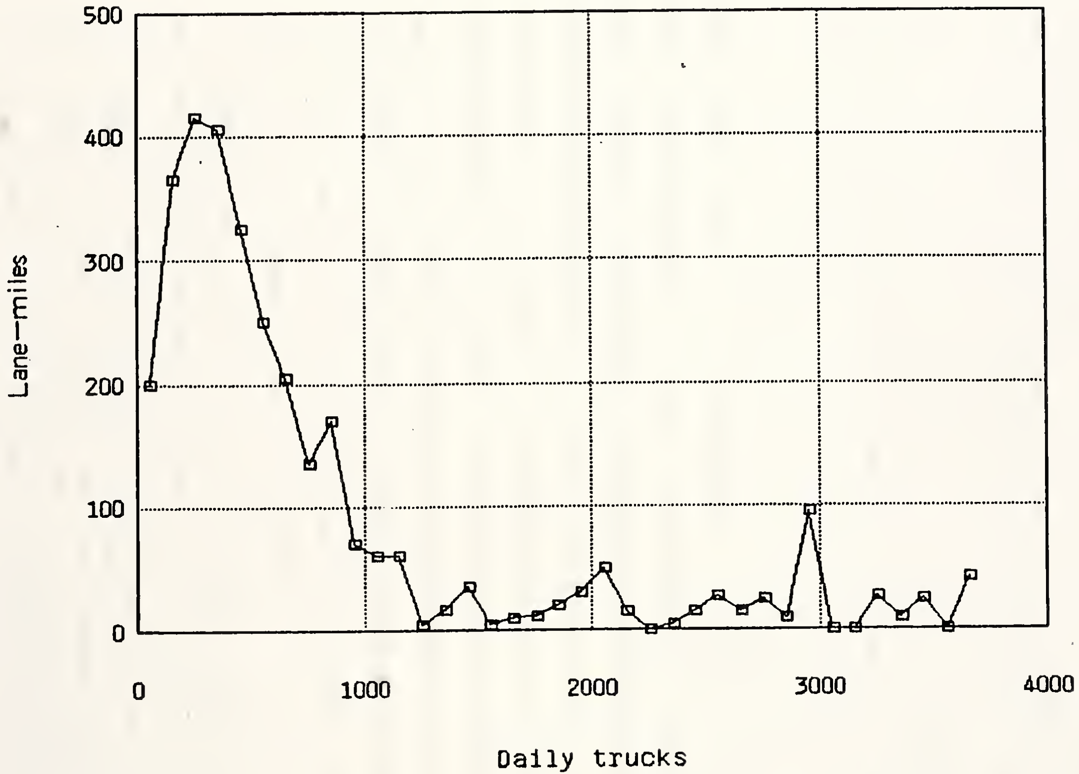


Figure A4 Flexible Pavements -- Truck Traffic Distribution.

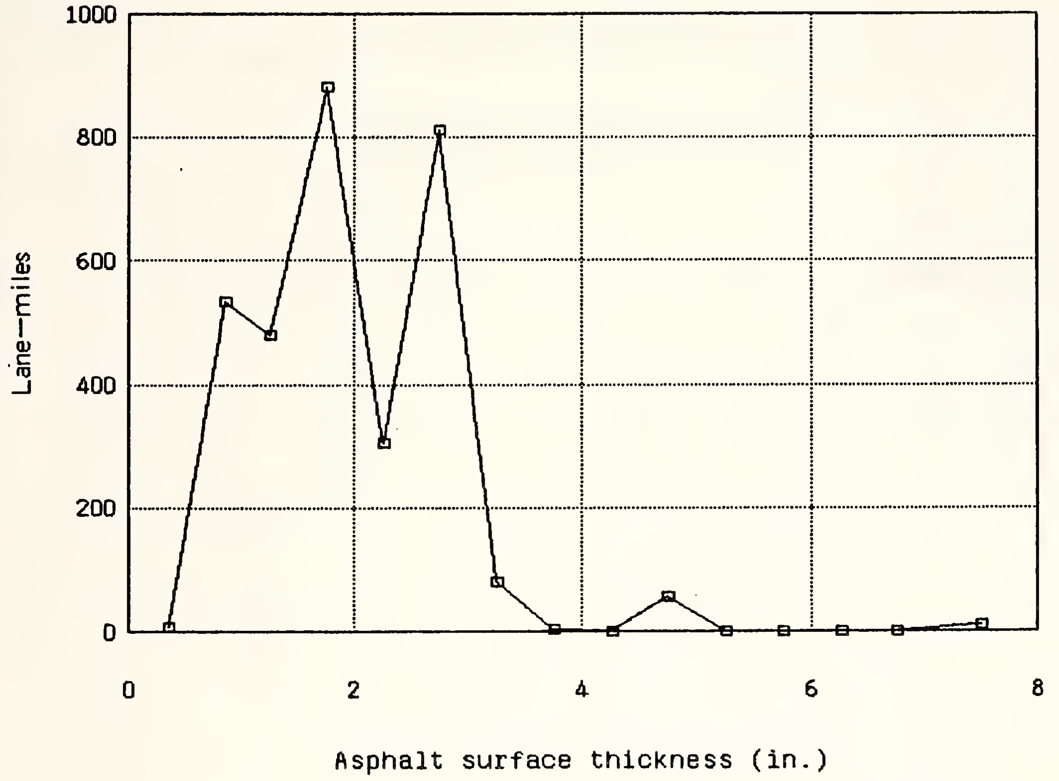


Figure A5 Flexible Pavements -- Asphalt Overlay Thickness Distribution.

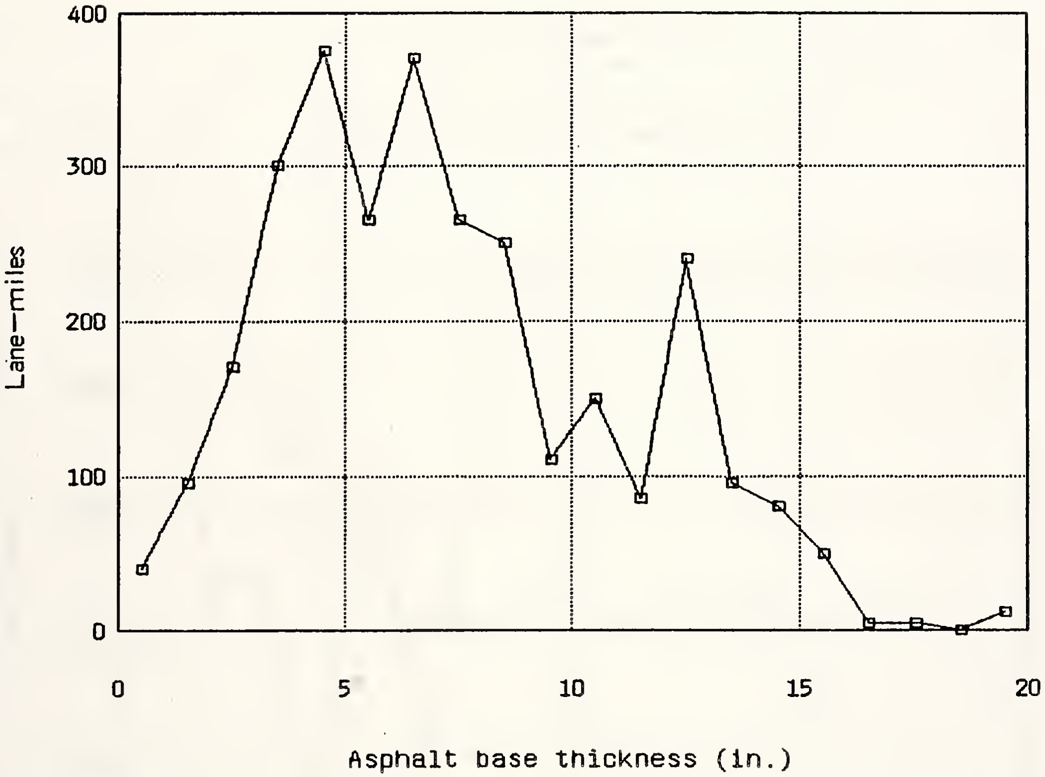


Figure A6 Flexible Pavements -- Asphalt Base Thickness Distribution.

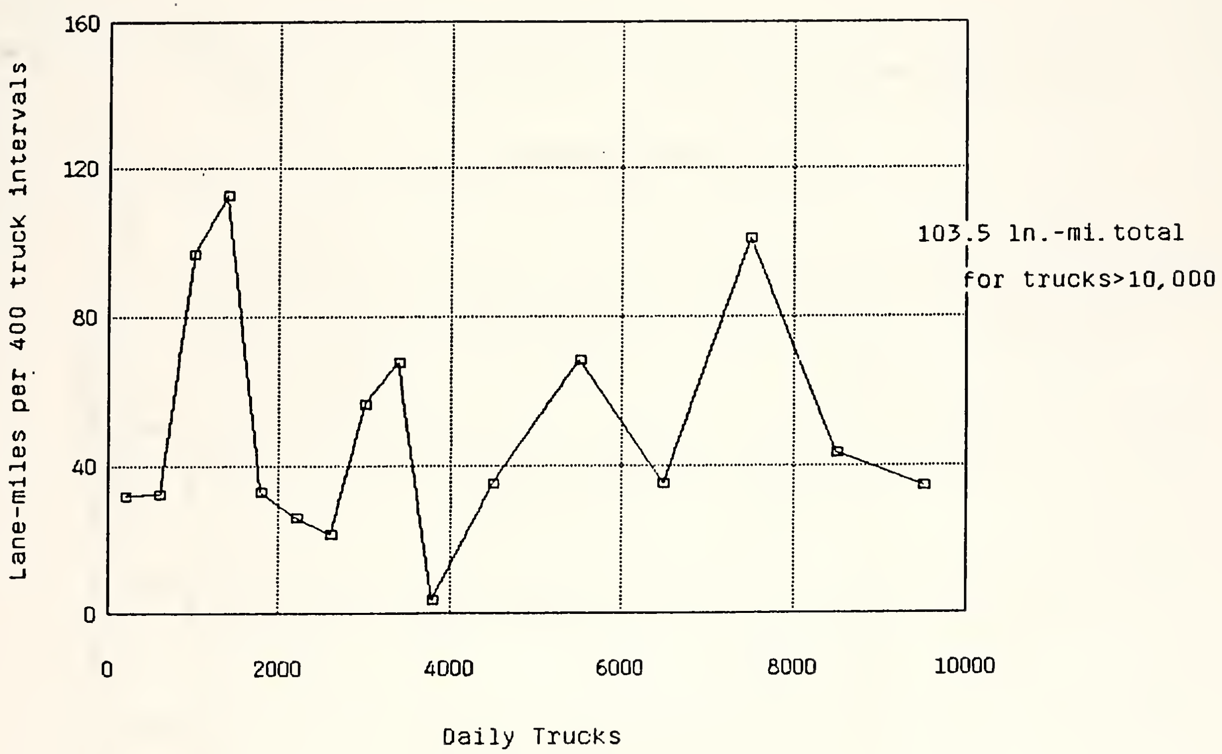


Figure A7 CRC Pavements -- Truck Traffic Distribution.

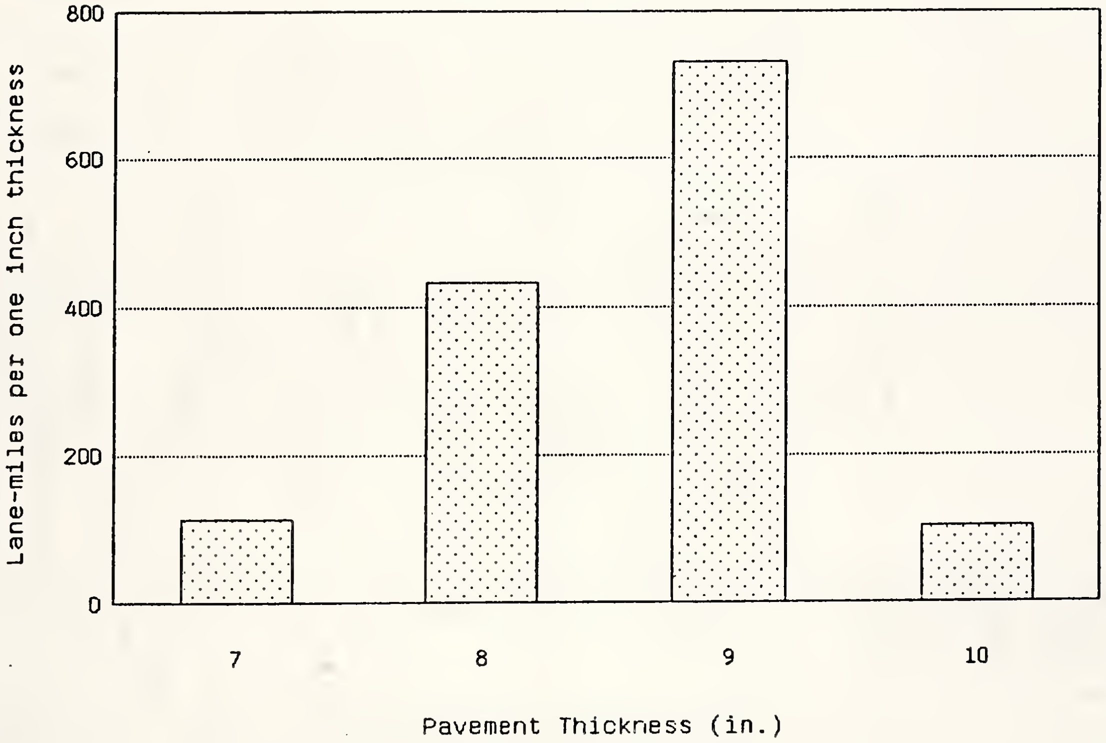


Figure A8 CRC Pavements -- Concrete Thickness Distribution.

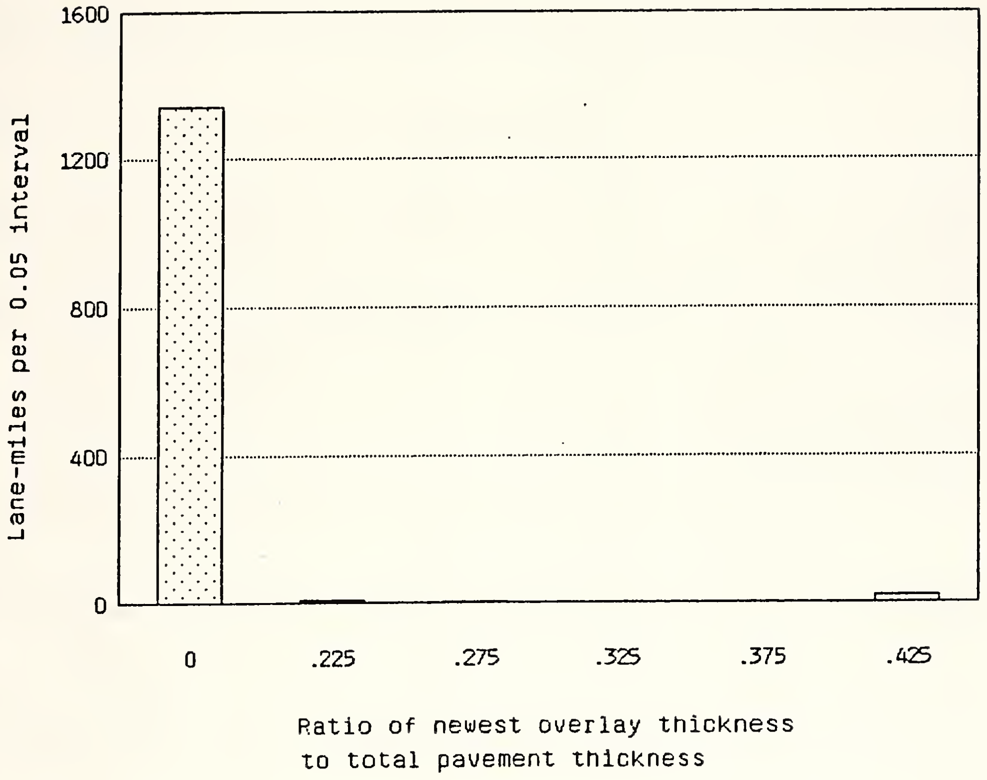


Figure A9 CRC Pavements -- Ratio of Newest Overlay Thickness to Total Pavement Thickness Distribution.

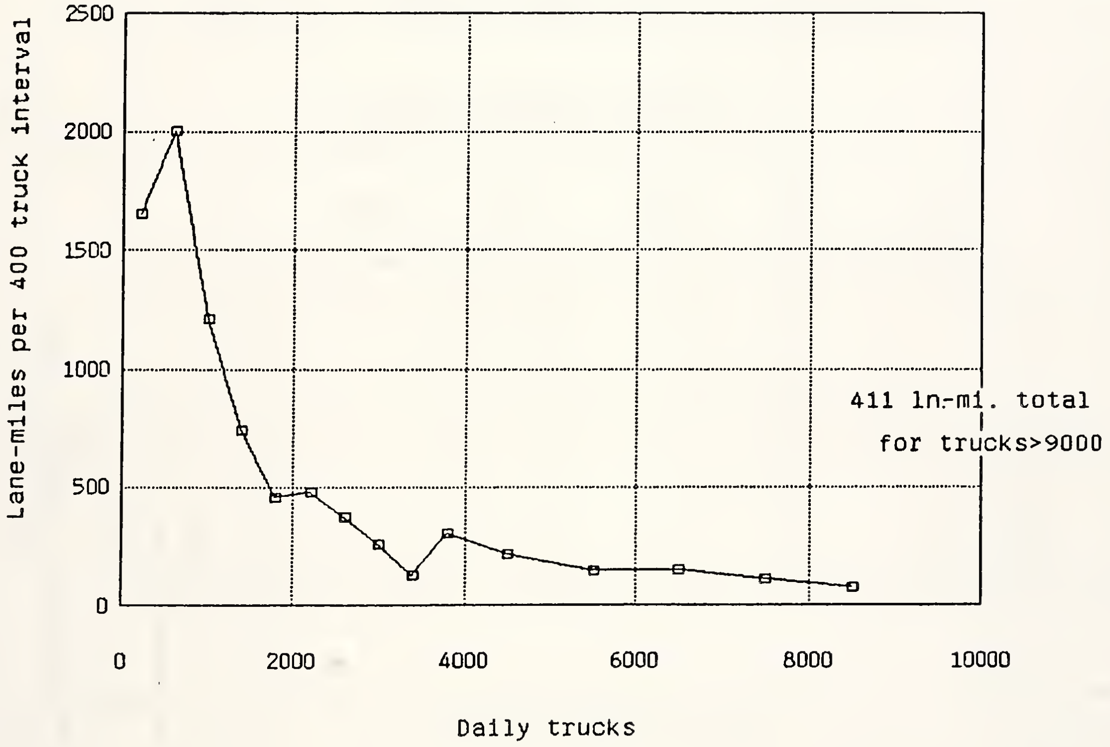


Figure A10 JRC Pavements -- Truck Traffic Distribution.

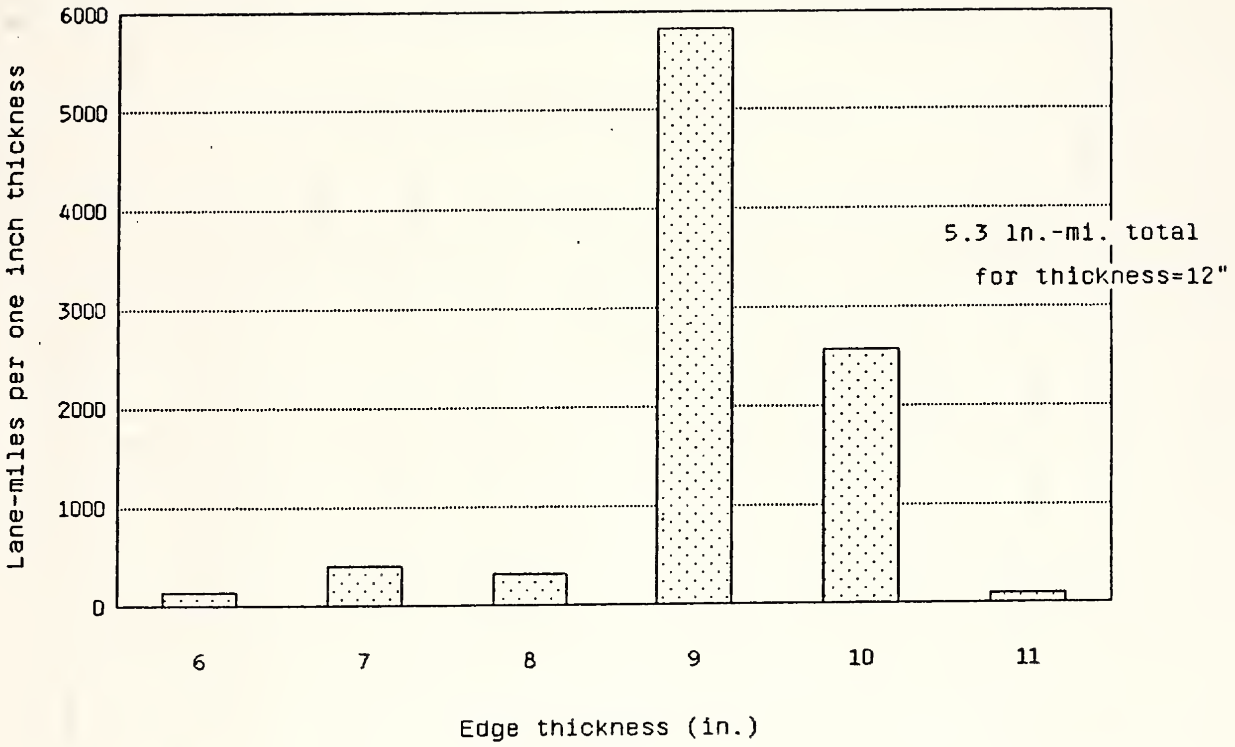


Figure A11 JRC Pavements -- Edge Concrete Thickness.

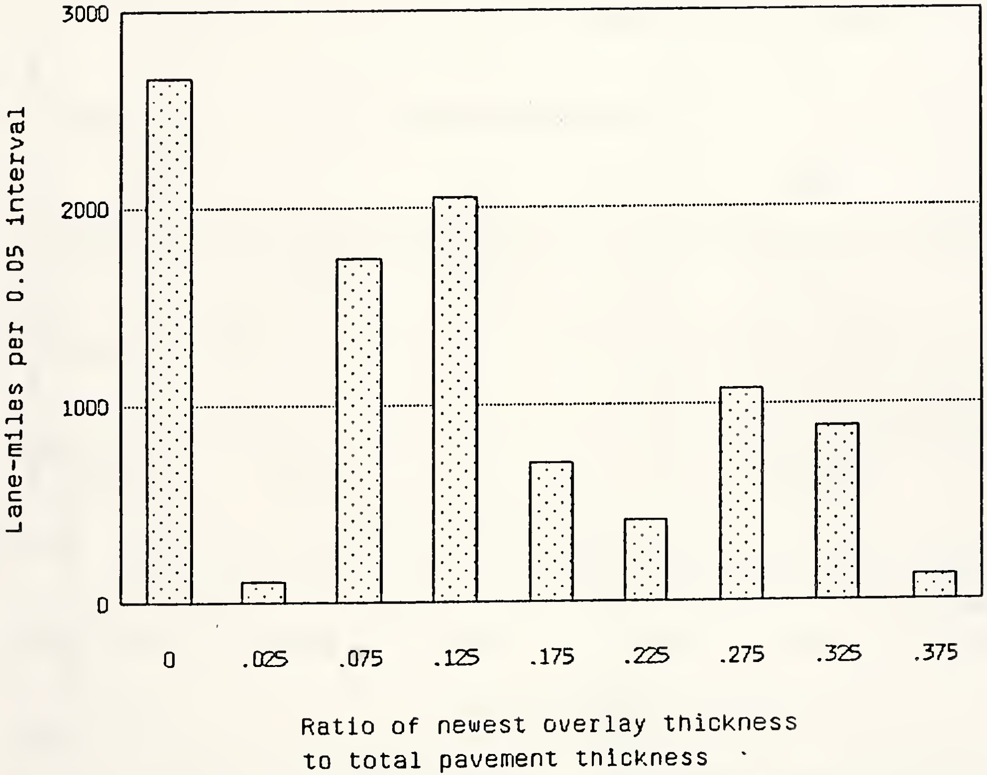


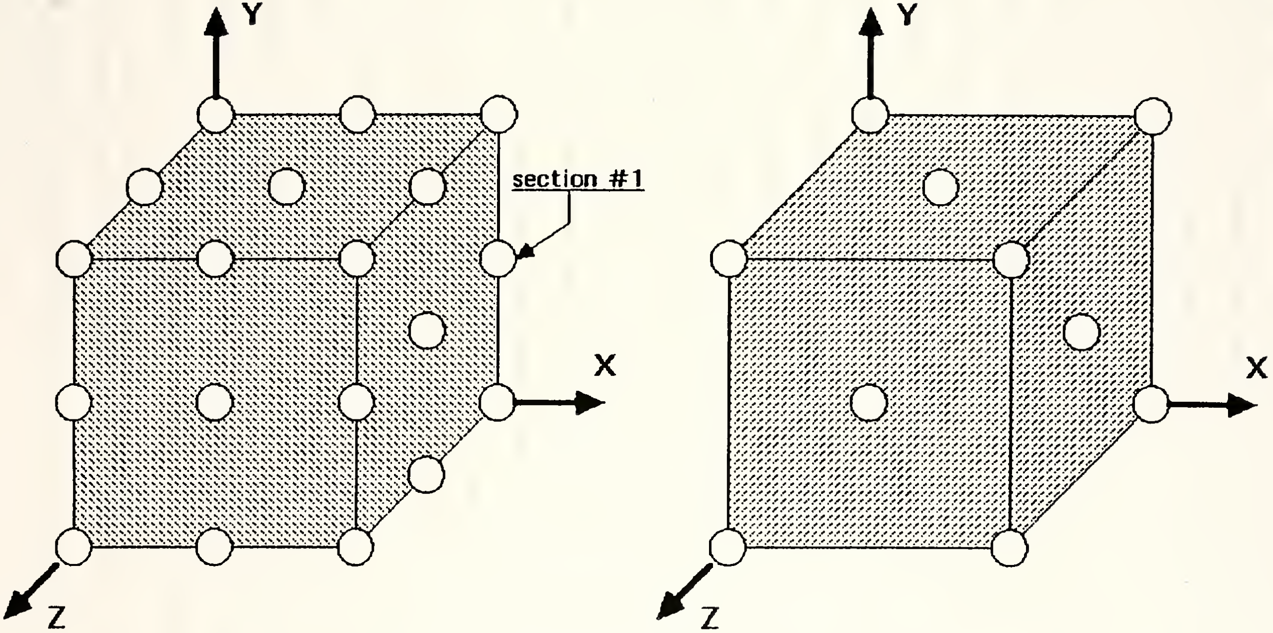
Figure A12 JRC Pavements -- Ratio of Newest Overlay Distribution.

In a similar manner, levels were set for the other factors considered in the experiment. The list of factor levels is shown in Table A1. The selection of three factors meant that a complete factorial experiment could not be run, because 162 test sections would be required for 6 of the 3^3 designs. Instead, composite designs (7) for each of the six experiments were selected. This type of design is a compromise. Although not as much information is obtained as in a complete factorial design, significantly fewer test section are required to gain that information. Unlike a complete factorial design, in a composite design not all levels of each factor are represented with all levels of each other factor.

Figure A13 illustrates the differences between a factorial design using three factors at three levels and a composite design for three factors at three levels for test pavement selection. In both Figures A13a and A13b, the x, y, and z axes represent the three factors. The circles each represent a different selected test section. Thus, in Figure A13a, (the complete factorial) test section #1 has factor x at a high level, factor y at a medium level, and factor z at a low level. Figure A13b represents the composite design. As may be noted, many of the mid-level test sections are missing, which means that this design does not provide as much information as the complete

Table A1 Experiment Factor Levels.

Pavement Type	Factor	Low Level	Mid Level	High Level
Flexible	Trucks per day	300	1450	2600
Flexible	Overlay thickness	1 in.	2 in.	3 in.
Flexible	Asphalt beneath overlay	3 in.	8 in.	13 in.
JCRP	Trucks per day	1075	3750	6425
JCRP	Ratio of most recent overlay thickness to total pvt. thickness	0.030	0.175	0.320
JCRP	PCC thickness	7.5 in.	8.5 in.	9.5 in.



a) factorial design — 27 test sections

b) composite design — 15 test sections

Figure A13 Factorial Design vs. Composite Design.

design. (In technical terms, it provides fewer error degrees of freedom.) In the composite design, the number of test sections (n) may be determined by

$$n = 2^k + 2k + 1 \qquad (1)$$

where k is the number of factors to be considered (3 in this case). Equation 1 gives the number of test sections if no factor combination is to be tested twice (repeated). The basis for the design is the 2^k factorial. The 2^3 pavement sections are at the 6 corners of the cube in Figure A13b, and they are called factorial points. However, because only two levels of each factor are included in a 2^k design, only linear effects of these factors may be determined when regression is employed. Thus, to investigate curvature in a regression relationship, more levels of each factor must be obtained. In this case, 2k + 1 = 7 additional points are included to allow curvature determination -- one combination is at the center level of all three factors, and six combinations are "star", or extreme, points that are located on lines which radiate from the center point through the midpoints of each of the six faces of the cube. The distance from the center point to each of these points is fixed so that the orthogonal nature of the design is maintained.

Therefore, in the proposed design, 15 test sections are required for each of the 6 experiments, for a total of

90 test sections -- a more reasonable number of sections to test in the allotted time and a considerable reduction from the 162 sections required by the 3^3 factorial design.

Thus far in the experiment design, no factor level combination was repeated (replicated). Ninety sections were considered the maximum for the testing time and financial constraints. However, some replication was still considered to be necessary. Thus, 3 of the 6 star points were eliminated from the design and were replaced by 3 replicates. Two of the eliminated star points were used to replicate two of the factorial points, and one was used to replicate a star point. During data analysis, these replicates will allow estimation of whether a first order (linear) polynomial is a complete fit or whether a second order (quadratic) should be applied. This estimation technique is called a lack-of-fit analysis.

Technical Discussion of Composite Design

What is the premise which allows one to reduce the number of test sections in the experiment by using the composite design? Although the detailed mathematical analysis is not required by the engineer using this technique, it is helpful to have a basic understanding of the underlying concepts before using the procedure.

The basic regression equation for the composite design when k=3 (15 factor level combinations) is

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_{12} X_1 X_2 + \beta_{13} X_1 X_3 + \beta_{23} X_2 X_3 + \beta_{11} X_1^2 + \beta_{22} X_2^2 + \beta_{33} X_3^2 + \varepsilon \qquad (2)$$

where $X_{1,2,3}$ are factor values, the betas (βs) are least square regression coefficients, and y is the dependent variable (deflection, roughness, or any other measured result). The error term has 5 degrees of freedom because the number of observations in the experiment (15) minus the number of beta terms (10) equals 5. (Note that the three factor interaction, $X_1X_2X_3$, and the two-factor, second-order interactions (e.g., $X_1^2X_2$) are considered zero and are left out of equation 2 as is often the case.) By comparison, a three-leveled factorial design will have 17 degrees of freedom in the error term if all two-factor, second order interactions and three-factor interactions are considered zero. The additional degrees of freedom would allow more confidence in the analysis but would require greater investment of time and finances because now $3^3 = 27$ factor level combinations must be tested instead of merely 15. The 5 degrees of freedom provided by the composite design are considered adequate for this analysis.

Detailed discussion of orthogonal polynomials and their advantages may be obtained from textbooks on statistical experimental design and response surface methodology (7,8).

TEST SECTION SELECTION

As stated previously, three equally-spaced levels were chosen for each factor. Subsequently, test sections were to be selected which satisfy the 15 combinations of these factor levels used in the composite design. In reality, even though there were 1,747 pavement sections to choose from, no section satisfies a factor combination exactly, and, in some cases, the closest fit was not as good as the researchers would have desired. Thus, during test section selection, sections were chosen whose factor values fell as close as possible to the desired factor levels.

Using the data base manager software, the computer was queried to supply pavement sections which complied with the requirements for each of the 15 different test sections in each of the six experimental designs. From one to perhaps 20 or 30 candidates were found for each description. These sections were plotted in 15 different colors on six separate maps. Final selection of test sections was based upon two criteria:

1. Sections in the extreme north or extreme south climate zones were favored which would tend to bring out the effects of the climate zone factor.

2. Sections were selected that were relatively close together which would minimize travel time between sites during field testing.

Unfortunately, there is not sufficient variation in CRCP in Indiana to fill out the desired experimental design. For example, low, medium, and high levels of traffic are desired. However, the CRC pavements were constructed for use as high-volume roads. Consequently test sections are not available in the low-volume categories. A similar situation occurs for the other factors as well. Overall, only 13 different CRCP sections were found in the state and were included in the test program. A general regression analysis will be performed to determine if the various factors have an effect on the pavement test (independent) variables.

Overall, thirty flexible test sections (15 in the north climate zone; 15 in the south climate zone), 30 JRCP sections, and 13 CRCP sections were selected for a total of 73 test sections.

In subsequent visits to the offices of each of the six highway districts in Indiana, the selected test sections were compared to lists of projected major maintenance projects for 1986. If a test section was scheduled to be overlaid in 1986, an alternate pavement section was selected. During these visits, arrangements were made to core the test sections to verify construction and maintenance records in the data base.

In addition, each test section was visited. Inside each test section (which could be as long as several miles) the beginning and end of a 1250′ final test section were marked. Markings consisted of yellow arrows painted on the centerline for 2-lane pavements; for multi-lane pavements, the yellow arrows were painted just off the pavement on the right shoulder. The 1250′ sections were chosen to be representative of the entire section, to avoid obstructions such as bridges, culverts, and railroad beds, and to provide sufficient sight distance for safety during testing.

FIELD NDT TESTING

For any one pavement test section, tests were conducted on the same day at the same time with four NDT test devices in the following order: Dynaflect, Road Rater Model 400 (RR400), Road Rater Model 2000 (RR2000), and Dynatest FWD Model AE1030. Testing was usually accomplished within a 40-minute period. If mechanical or electronic troubles were encountered, the test period stretched to as long as 1.5 hours. During the spring test period, pavement surface temperature was measured twice at each section with an infrared temperature sensor (Omega Engineering, Inc., Model OS 600). During the summer/fall test period, readings were taken three times at each section.

Due to mechanical breakdowns, some pavements were not tested on the same day by all test devices. For a summary of the test schedule, see Tables A2 and A3.

Six sites were tested with each device within each 1250′ test section. The sites were normally 120′ to 180′ apart and were located in the outside wheel path of the outside lane. On rigid or composite pavement sections, the distance from the nearest joint or crack was noted.

The spring series of test results were obtained during a five-week period in the early spring (3/17/86 - 4/25/86) when pavement deflections tend to peak due to pavement layer and subgrade thaw. Climatological data (9) from the National Oceanic and Atmospheric Administration (NOAA) indicated that the southern portion of Indiana begins spring thaw approximately two weeks before northern Indiana. Therefore, testing began in the south climate zone after spring thaw was well underway and moved north. Yellow x′s were painted on the six test sites within each section so that the same sites would be tested during the

Table A2 Spring Deflection Testing Equipment Usage.

	Ft. Wayne	LaPorte	Green-field	Crawfords-ville	Seymour	Vincennes
All Equip.	1,2,5[+],6,9, 10,12,13,14,15, 16,17,18,19	3,4,5,6,7 8,9,10,11, 12,15,17	1,3	1,2,3,4	3,9,11	--
Dynaflect, RR400,2000	7,8,11	--	--	--	6,7,8, 12,15	1,2,3, 5,6
Dynaflect, RR2000,FWD	--	--	--	--	10,13,14	--
Dynaflect, RR400,FWD	3	1,2,13, 14,16	2	5,6,7,8	1,2,4[*], 5,16	--
FWD, RR400,2000	--	--	--	--	--	4,8
Dynaflect, RR400	--	--	--	--	--	7
Dynaflect, RR2000	4	--	--	--	--	--
FWD,RR400	--	--	--	--	--	9,10
Dynaflect	--	--	--	--	--	4,8,9,10
FWD	4,7,8,11	--	--	--	6,7,8, 12,15	1,2,3 5,6,7

[+] FWD used only in right wheelpath, not midlane

[*] FWD completed first three sites only

Table A3 Summer/Fall Deflection Testing Equipment Usage.

	Ft. Wayne	LaPorte	Green-field	Crawfords-ville	Seymour	Vincennes
All Equip.	--	--	--	1,3,4, 5,8	1,2,3,4,5, 6,9,10,11, 12,13,14, 15,16	1,2,3,4, 5,6,7,8
Dynaflect, RR400,FWD	1,2,3,4,5,6, 7,8,9,10,11, 12,13,14,15, 16,17,18,19	1,3,4,5, 6,7[*],8,9, 10,11,12,13, 14,15,16,17	--	--	--	--
Dynaflect, RR400,2000	--	--	1,2,3	--	--	9,10
Dynaflect, RR2000,FWD	--	--	--	--	7,8	--
Dynaflect, RR400	--	--	--	2,6,7	17	--
FWD	--	--	1,2,3	2,6,7	17	9,10

[*] Only three sites tested. These were all that could be found after overlay.

summer/fall test period.

The bulk of the summer/fall test period was completed from 8/5/86 to 9/5/86. However, due to equipment breakdowns, some devices had to go back at a later date to test pavements that had already been tested by the other devices. Testing with the RR400 and the Dynaflect was conducted in this manner on 10/30/86, and the FWD on 11/17/86, 11/18/86, and 11/24/86.

In addition, the RR2000 was only made available for the first two weeks of the test period in the summer/fall test period. During that time, only test sections in the south climate zone were tested.

TEST DEVICES

The Dynaflect (Figure A14) is also a steady state deflection device with only one dynamic force and one frequency for the dynamic force. Thus, all deflection readings throughout the test sequence reflect a 2000-lb static weight and a 1000-lb peak-to-peak dynamic load applied at 8 Hz. Deflections were recorded at the center of the load and at 1′, 2′, 3′, and 4′ from the center.

The RR400 (Figure A15) is a steady state dynamic device which applies an initial static load of 1800-lb and

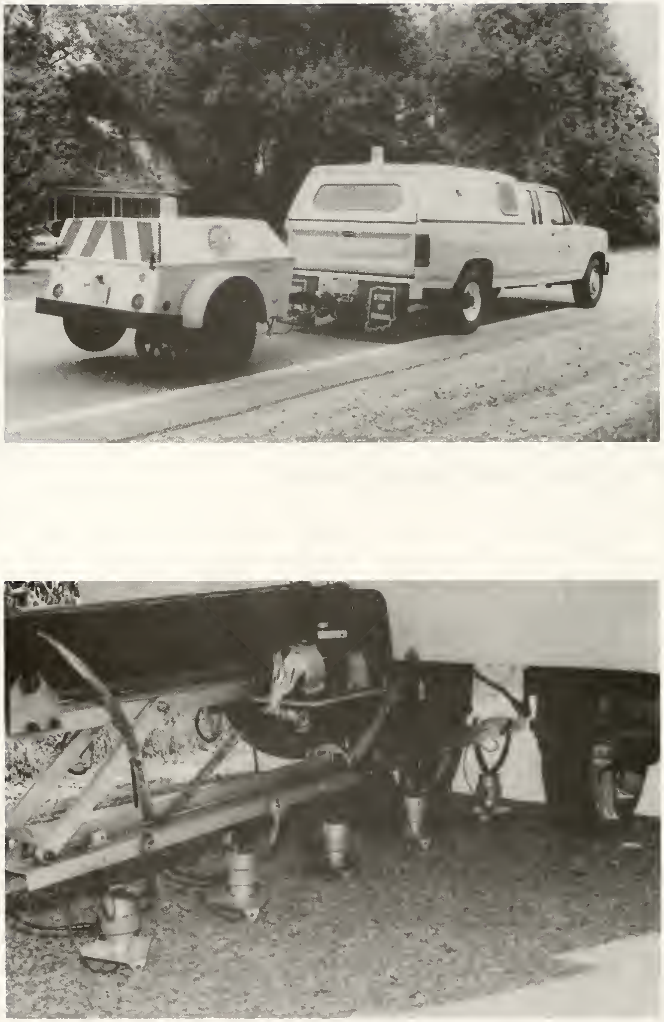


Figure A14 The Dynaflect.

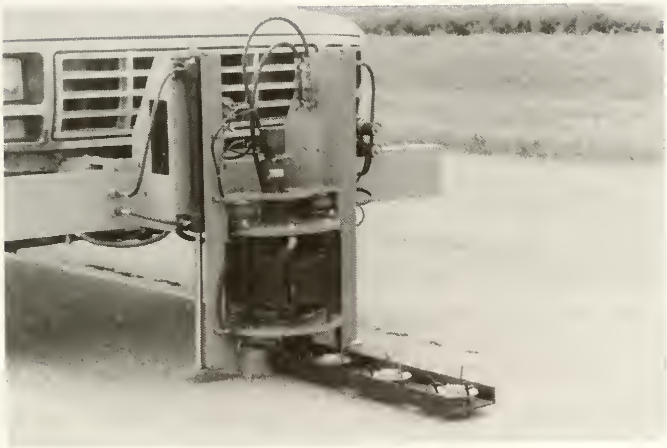


Figure A15 The Road Rater 400.

a peak-to-peak dynamic load which can vary from 500-lb to 2800-lb with a frequency that can be varied from 5 Hz to 70 Hz. For this research project, sites 1 to 5 were tested at 25 Hz at each of 3 different dynamic loads: 600-lb, 1200-lb, and 1800-lb. Deflection readings were recorded for each of the three dynamic load levels at each site. At site 6, the 600, 1200, and 1800-lb loads were each tested at 15 Hz, at 25 Hz, and at 35 Hz. Velocity sensors measured deflection for each loading at each frequency. The sensors are located at the center of the load and at 1′, 2′, and 3′ from the center.

The RR2000 (Figure A16) is a larger version of the RR400, with a static load of 3800-lb and a wider range of dynamic loads. On sites 1-5 of each test section, peak-to-peak dynamic forces of 600, 1200, 1800, 2400, and 3600-lb were each applied to the pavement at 25 Hz, and deflection readings were taken for each force. On site 6, a frequency sweep was conducted: readings were taken for each of the dynamic loadings at 15 Hz, at 25 Hz, and at 35 Hz. The velocity sensors for the RR2000 are also located directly under the load and 1′, 2′, and 3′ from the load.

The Dynatest FWD Model AE1030 (Figure A17) is an impulse load NDT device. In this research project, the load was dropped from four different heights, imparting impact loads of approximately 3000-lb, 6500-lb, 10000-lb,

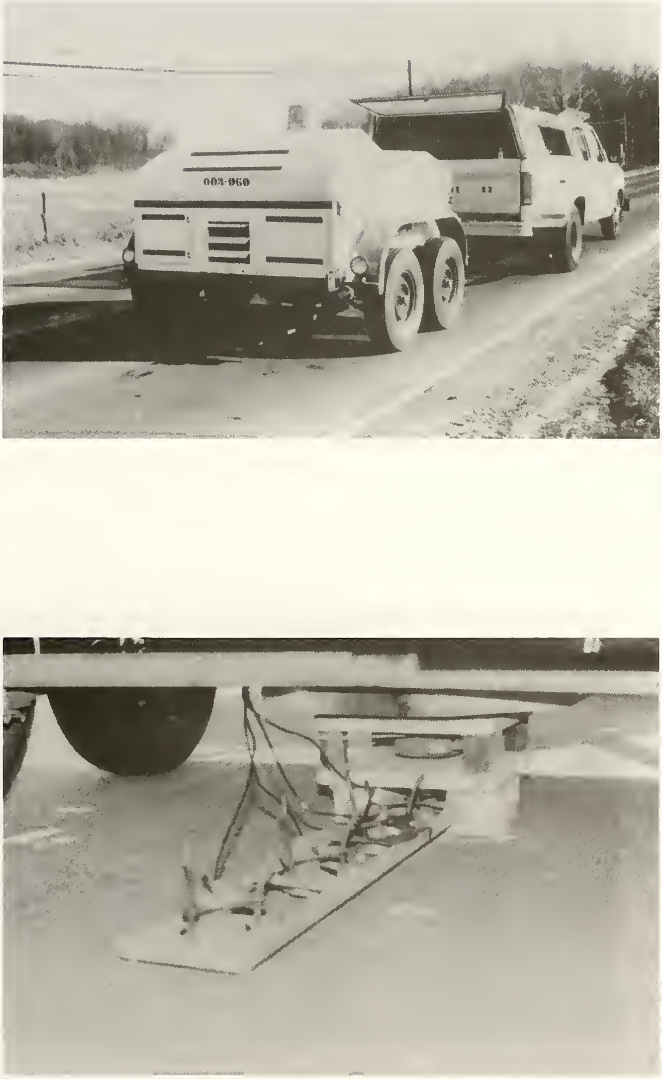


Figure A16 The Road Rater 2000.

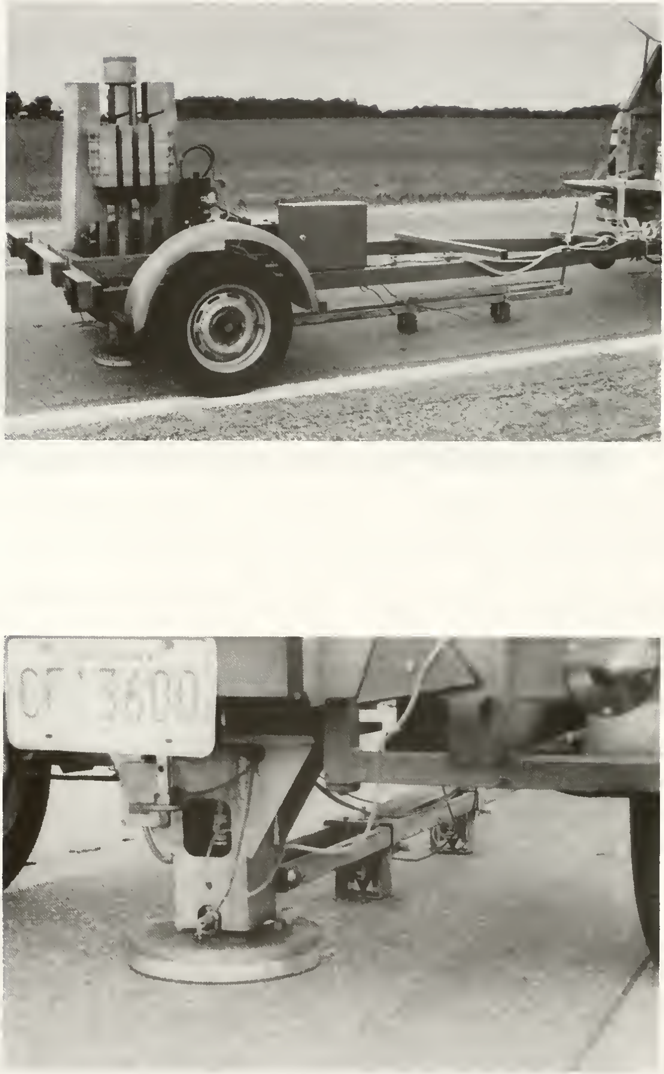


Figure A17 The Dynatest FWD Model AE1030.

and 14000-lb. Deflection sensors are located at the point of load and at two offset distances. The sensor at the load is fixed while the other two are moveable. On sites 1-4 of each test section, the 6500 and 14000-lb dynamic loads were each applied twice, with the movable sensors set at 1′ and 3′ from the load for the first drop and at 2′ and 4′ for the second drop. At the fifth site, the 6500 and 14000-lb loads were each applied three times, with the deflection sensors moved to 5′ and 7′ for the third drop. Finally, at site 6, each of the four dynamic loads was applied twice, first with the sensors at 1′ and 3′, then with the sensors at 2′ and 4′.

PAVEMENT CORES AND SOIL BORINGS

Two pavement cores and one set of two shelby tube samples were taken for each of the test sections. The IDOH district offices obtained 6-inch diameter pavement cores at approximately the one-third points of the test sections. The actual pavement layer thicknesses from these two cores were averaged, and the results were assumed to be the thicknesses of the pavement layers throughout each test section. These insitu layer thicknesses replaced the values for thickness found in Road Life Records and were used in the subsequent statistical analysis.

Because the subgrade is a controlling factor for pavement behavior and performance, it was deemed necessary to obtain information on the subgrade soil. The IDOH Materials and Tests Division obtained shelby tube samples at each test section. Although sampling at several locations throughout each test section was desirable, time and personnel constraints dictated one boring per section. In Fort Wayne, LaPorte, Greenfield, and Vincennes Districts, a new pavement core was drilled (in addition to the two which had previously been taken) and four feet of 3-inch diameter shelby tube was pushed into the subgrade. In the remaining two districts, Seymour and Crawfordsville, the tubes were pushed in existing core holes after the filler material was removed. Boring logs included descriptions and thicknesses of the pavement materials, the granular layers below the asphalt or concrete, and the subgrade soil. The top two feet of the subgrade sample was tested for density, moisture content, gradation, and Atterberg limits. This information was used to classify the soil and to estimate its in-place strength. The estimated subgrade strength was then incorporated into the statistical analysis for overlay design.

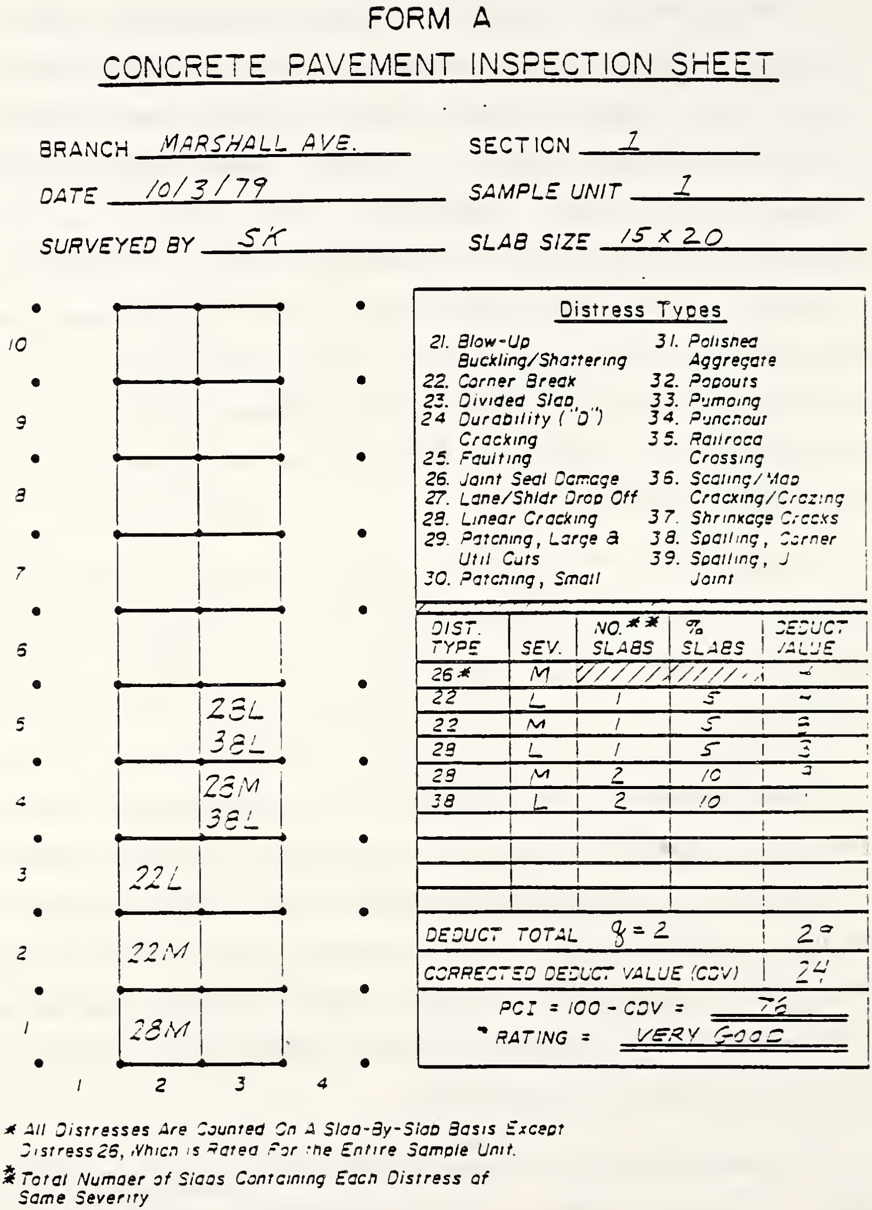
CONDITION SURVEYS

During summer/fall field testing, condition surveys were performed on each individual pavement test section. These surveys determine the extent and severity of pavement surface distresses such as rutting, polishing, various types of cracking, etc. The PAVER (10) condition survey method was adopted for this research. PAVER deducts values for each distress depending on the extent and severity from an initial score of 100 and calls the result the Pavement Condition Index (PCI). Thus, a pavement with a PCI of 90 is in excellent condition, while one with a PCI of 24 is in very poor condition.

Example survey forms for concrete-surfaced and for asphalt-surfaced pavements are given in Figure A18 and Figure A19. The forms list all the distresses to be recorded.

Each pavement test section is approximately 1250′ long. Within each section, six test sites are located 120′-180′ apart. A condition survey of 120′-180′ requires up to one-half hour, which consumes most of the time required to complete NDT testing. Thus, for each of the 73 test sections, one of the intervals between test sites was randomly selected to be surveyed.

Two adjustments were made in the PAVER survey method. First, only one pavement lane was surveyed, not the entire



FORM A

CONCRETE PAVEMENT INSPECTION SHEET

BRANCH MARSHALL AVE.

SECTION 1

DATE 10/3/79

SAMPLE UNIT 1

SURVEYED BY SK

SLAB SIZE 15 x 20

10
9
8
7
6
5
4
3
2
1
1
2
3
4
23L
38L
28M
38L
22L
22M
28M

Distress Types

- 21. Blow-Up Buckling/Shattering
- 22. Corner Break
- 23. Divided Slab
- 24 Durability ("D") Cracking
- 25. Faulting
- 26. Joint Seal Damage
- 27. Lane/Shldr Drop Off
- 28. Linear Cracking
- 29. Patching, Large & Util Cuts
- 30. Patching, Small
- 31. Polished Aggregate
- 32. Popouts
- 33. Pumping
- 34. Punchout
- 35. Railroad Crossing
- 36. Scaling/Map Cracking/Crazing
- 37. Shrinkage Cracks
- 38. Spalling, Corner
- 39. Spalling, Joint

DIST. TYPE	SEV.	NO.** SLABS	% SLABS	DEDUCT VALUE
26*	M			[illegible]
22	L	1	5	[illegible]
22	M	1	5	[illegible]
28	L	1	5	3
28	M	2	10	[illegible]
38	L	2	10	[illegible]
DEDUCT TOTAL	q = 2			29
CORRECTED DEDUCT VALUE (CDV)				24

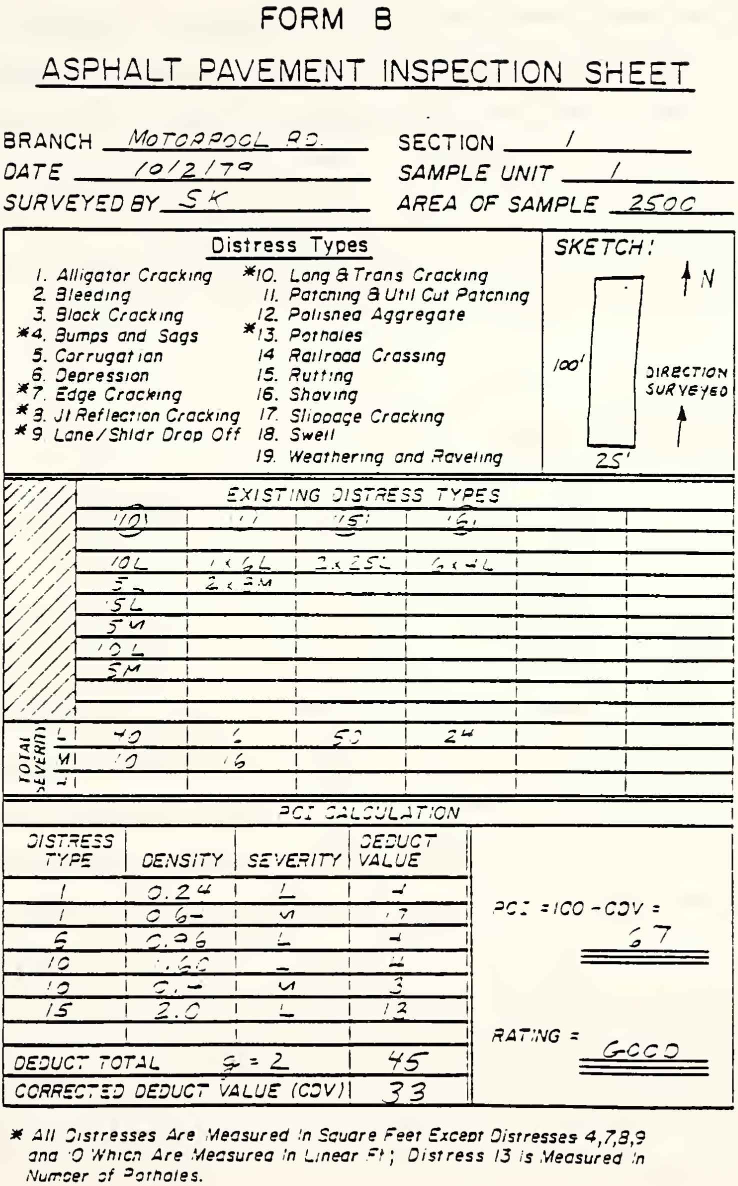
PCI = 100 - CDV = 76

* RATING = VERY GOOD

* All Distresses Are Counted On A Slab-By-Slab Basis Except Distress 26, Which is Rated For the Entire Sample Unit.

** Total Number of Slabs Containing Each Distress of Same Severity

Figure A18 Condition Survey Form for Concrete.



FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH MOTORPOOL RD.
SECTION 1
DATE 10/2/79
SAMPLE UNIT 1
SURVEYED BY SK
AREA OF SAMPLE 2500

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9 Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14 Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:

N

100'

25'

DIRECTION SURVEYED

EXISTING DISTRESS TYPES

	(10)	(1)	(15)	(6)		
	10L	1×6L	2×25L	6×4L		
	5L	2×8M				
	15L					
	5M					
	10L					
	5M					
TOTAL SEVERITY L	40	6	50	24		
M	10	16				
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
1	0.24	L	4
1	0.64	M	17
6	0.96	L	4
10	1.60	L	4
10	0.4	M	3
15	2.0	L	12
DEDUCT TOTAL	q = 2		45
CORRECTED DEDUCT VALUE (CDV)			33

PCI = 100 − CDV = 67

RATING = GOOD

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 is Measured In Number of Potholes.

Figure A19 Condition Survey Form for Asphalt.

pavement surface. Thus, to be consistent, longitudinal cracking between the lane to be surveyed and the adjoining lane in asphalt pavements was always included among the distresses noted. Secondly, PAVER does not include a specific method for evaluating CRC pavements. Pavements with CRC surfaces were evaluated as JRC pavements with imaginary, perfect, transverse joints at 20′ intervals.

PAVEMENT ROUGHNESS DATA

Pavement roughness data for 1986 was obtained from the IDOH Division of Research & Training (R&T) (11). R&T tests pavements with one Cox Model B, PCA roadmeter and one Cox Model E, PCA roadmeter. The basic pavement roughness test result is the roughness number (RN) which gives a measure of the size and number of bumps experienced by an automobile passenger traveling over a length of road. The RN is translated into a Present Serviceability Index (PSI) value through regression equations developed by R&T (12).

The range of PSI values is from 0 to 5, with 5 being a perfect pavement and 0 an exceedingly poor one. However, when using the R&T regression equations, PSI′s of greater than 5 may be calculated. When this occurs, the PSI value is reported as 5.

For some test sections, 1985 roughness data (PSI values) is used in place of 1986 data. This substitution occurred for one of two reasons:

1. Although all Indiana highways are tested annually, some portions of pavement are missed. If this occurred for one of the test sections, 1985 data was used.
2. If a test section was chip sealed in 1986 after NDT testing but before roughness was measured, the 1986 roughness data is not compatible with the NDT data. In this case, 1985 data is used.

CHECKING DEFLECTION READINGS

A device and procedure was utilized to check the deflection measured by the sensors used with the four NDT devices. Four direct current linear variable differential transformers (LVDT´s) were mounted on an 8-foot long wooden beam similar to that used by Baladi (13). This "reference beam" is shown in Figure A20. The LVDT´s were carefully calibrated in the laboratory. In operation, the LVDT´s were located adjacent to the deflection sensors for the NDT devices, a test load was applied, and the readings from the two sets of sensors were recorded and compared.

The LVDT´s gaging range was ± 0.25 inches; with a

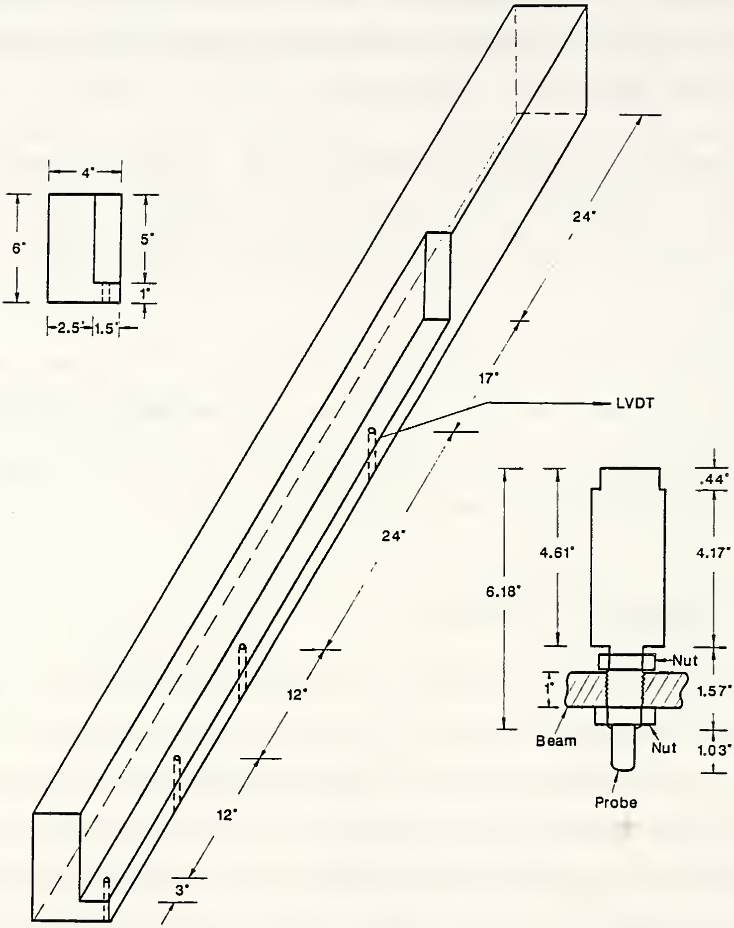


Figure A20 The Reference Beam Fitted With LVDT's.

sensitivity of 41.1 volts/inch. Leads from the LVDT´s ran to a 12-channel light beam oscillograph recorder with a maximum sensitivity of 0.05 volts/inch. The oscillograph recorded the displacements on light-sensitive paper. Once mounted, the accuracy of the LVDT´s was confirmed by comparing their output against a micrometer caliper of 0.0005 inch accuracy.

In tests of all four NDT devices on both asphalt and concrete pavements conducted at the IDOH Research & Training Center in W. Lafayette, Indiana, the reference beam was positioned as shown in Figure A21. The beam was supported on a 4-inch diameter section of pipe which was placed 6-7 feet away from the NDT loading point (this distance kept the support of the beam out of the deflection basin of the load). The beam was leveled by raising or lowering a jack which was placed under the end of the beam. After being leveled, the beam was locked in position by placing a weight on the beam above the jack.

Extendable screwjacks were placed between the tip of the LVDT probe and the pavement surface. The probe tip matched an indentation in the top of the screw jack. A zero was obtained for each LVDT by adjusting the height of the screwjacks.

During project planning, it was hoped that the LVDT´s

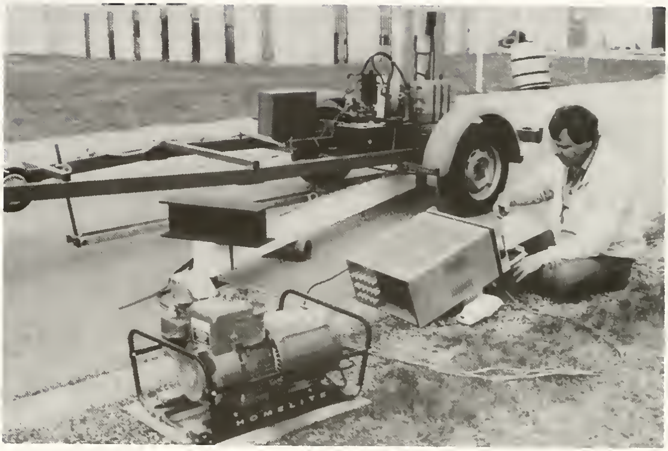


Figure A21 Checking FWD Against Reference Beam.

on the beam could be simultaneously positioned next to the sensors on the NDT devices. In practice, the NDT devices geometries did not allow this. Thus, in the field, every individual NDT sensor except at the point of load was tested separately after re-positioning the #1 beam LVDT as close as possible to an NDT sensor and at an equal distance from the load center.

Field tests were performed during one day of the spring test period. On that day, the following tests were completed:

1. The FWD was tested only on flexible pavement.
2. The RR2000 was only tested on flexible pavement.
3. The RR400 was only tested on flexible pavement.
4. The Dynaflect was tested on flexible and concrete pavement.

Deflection test results are shown in Tables A4-A6. They indicate that, within a reasonable error, the FWD sensors were providing accurate deflection readings. The results also show that the LVDT readings did not agree with deflection readings of either Road Rater.

Although some pattern in the Road Rater data may be detected, e.g. the similarity in the "% difference" column for sensors two feet and three feet from load for the

Table A4 Spring FWD Check--Asphalt.

Test#	Sensor Loc.	Load(KPa)	FWD Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	414	7.5	7.3	-2.7
2	1 ft.	414	7.0	6.8	-2.9
3	1 ft.	414	7.0	6.8	-2.9
4	1 ft.	890	16.2	16.4	1.2
5	1 ft.	890	16.2	16.2	0.0
6	1 ft.	890	16.3	16.5	1.2
7	3 ft.	414	-----	VOID	-----
8	3 ft.	414	3.07	2.76	-11.0
9	3 ft.	414	3.03	2.84	-6.7
10	3 ft.	414	3.07	2.84	-8.1
11	3 ft.	890	7.20	7.30	1.4
12	3 ft.	890	7.24	7.06	-2.6
13	3 ft.	890	7.24	7.14	-1.4

Table A5 Spring RR2000 Check--Asphalt.

Test#	Sensor Loc.	Load(lb)	RR2000 Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	1200	1.04	0.49	-112.0
2	1 ft.	1200	----	VOID	------
3	1 ft.	1200	1.01	0.50	-102.0
4	1 ft.	2400	2.17	2.17	0.0
5	1 ft.	2400	2.19	2.14	-2.3
6	1 ft.	2400	2.20	2.26	2.7
7	1 ft.	3600	3.45	3.77	8.5
8	1 ft.	3600	3.43	3.65	6.0
9	1 ft.	3600	3.42	3.77	9.3
10	2 ft.	1200	0.70	1.30	46.2
11	2 ft.	1200	0.69	1.38	50.0
12	2 ft.	1200	0.71	1.26	43.7
13	2 ft.	2400	1.48	2.43	39.1
14	2 ft.	2400	1.47	2.43	39.5
15	2 ft.	2400	1.48	2.35	37.0
16	2 ft.	3600	2.26	3.41	33.7
17	2 ft.	3600	2.24	3.41	34.3
18	2 ft.	3600	2.23	3.45	35.4
19	3 ft.	1200	0.41	0.78	47.4
20	3 ft.	1200	0.42	0.78	46.2
21	3 ft.	1200	0.42	0.83	49.4
22	3 ft.	2400	0.88	1.55	43.2
23	3 ft.	2400	0.87	1.55	43.8
24	3 ft.	2400	0.88	1.55	43.2
25	3 ft.	3600	1.37	2.28	39.9
26	3 ft.	3600	1.36	2.28	40.4
27	2 ft.	3600	1.37	2.28	39.9

Table A6 Spring RR400 Check--Asphalt.

Test#	Sensor Loc.	Load(lb)	RR400 Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	1200	1.26	1.54	18.2
2	1 ft.	1200	1.26	1.46	13.7
3	1 ft.	1200	1.26	1.46	13.7
4	1 ft.	1800	2.05	2.43	15.6
5	1 ft.	1800	2.04	2.60	21.5
6	1 ft.	1800	----	VOID	-----
7	2 ft.	1200	0.64	1.14	43.8
8	2 ft.	1200	0.63	1.14	44.7
9	2 ft.	1200	0.63	1.14	44.7
10	2 ft.	1800	1.26	1.78	29.2
11	2 ft.	1800	1.20	1.78	32.6
12	2 ft.	1800	1.20	1.82	34.1
13	3 ft.	1200	0.54	0.41	-31.7
14	3 ft.	1200	0.55	0.45	-22.2
15	3 ft.	1200	0.55	0.41	-34.1
16	3 ft.	1800	1.22	1.30	6.2
17	3 ft.	1800	1.25	1.34	6.7
18	3 ft.	1800	1.25	1.38	9.4

RR2000, the general lack of agreement between the LVDT's and the sensors was disturbing.

No data is given for the Dynaflect. During tests, the oscillograph output remained flat, indicating that no deflection was being measured by the beam. Dynaflect loads are small and result in correspondingly small deflections that were on an order of 0.0001 inch. Such small deflections are outside the capability of the LVDT's used on the reference beam.

Due to the problems encountered in the first test session, one day in the summer/fall test period was also set aside for reference beam testing:

1. The RR2000 was tested on both asphalt and concrete pavements.
2. The RR400 was tested on both asphalt and concrete pavements.
3. The FWD was tested on only concrete pavement.

Test results were similar to spring results and are shown in Tables A7-A11. Again, the FWD sensors appear to give reasonable agreement with the LVDT's. A consistent, general trend was not identified for the Road Raters when comparing the same device from spring test date to summer test date. However, the summer RR2000 concrete pavement

Table A7 Summer RR2000 Check--Asphalt.

Test#	Sensor Loc.	Load(lb)	RR2000 Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	1800	2.27	2.00*	-13.5
2	1 ft.	1800	2.21	2.34*	5.6
3	1 ft.	1800	2.27	1.27*	78.7
4	1 ft.	1800	----	VOID	-----
5	1 ft.	2400	3.07	2.92*	-5.1
6	1 ft.	2400	3.07	2.87*	-7.0
7	2 ft.	2400	1.47	2.86	48.6
8	2 ft.	2400	1.49	2.70	44.8
9	2 ft.	3600	2.25	4.26	47.2
10	2 ft.	3600	2.25	4.30	47.7
11	3 ft.	1800	0.49	0.29*	-69.0
12	3 ft.	1800	0.50	0.44*	-13.6
13	3 ft.	2400	0.69	1.22	43.4
14	3 ft.	2400	0.68	1.46	53.4
15	3 ft.	3600	1.05	2.80	61.4
16	3 ft.	3600	1.05	2.77	62.1

*Possible reference beam system malfunction.

Table A8 Summer RR2000 Check--Concrete.

Test#	Sensor Loc.	Load(lb)	RR2000 Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	1800	1.32	4.62	71.4
2	1 ft.	1800	1.32	4.62	71.4
3	1 ft.	2400	1.77	7.42	76.1
4	1 ft.	2400	1.78	7.30	75.6
5	2 ft.	1800	1.17	3.77	68.9
6	2 ft.	1800	1.15	3.83	70.0
7	2 ft.	2400	1.55	5.32	70.8
8	2 ft.	2400	1.56	5.47	71.4
9	3 ft.	1800	0.91	3.22	71.7
10	3 ft.	1800	0.92	3.28	71.9
11	3 ft.	2400	1.23	4.27	71.1
12	3 ft.	2400	1.22	4.51	72.9

Table A9 Summer RR400 Check--Asphalt.

Test#	Sensor Loc.	Load(lb)	RR400 Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	1200	1.69	2.31	26.8
2	1 ft.	1200	1.69	2.62	35.5
3	1 ft.	1800	3.83	4.59	16.6
4	1 ft.	1800	3.83	4.68	18.2
5	2 ft.	1200	----	VOID	----
6	2 ft.	1200	1.02	1.82	44.0
7	2 ft.	1800	----	VOID	-----
8	2 ft.	1800	----	VOID	-----
9	3 ft.	1200	0.64	1.31	51.1
10	3 ft.	1200	0.64	1.34	52.2
11	3 ft.	1800	1.32	1.82	27.5
12	3 ft.	1800	1.32	1.82	27.5

Table A10 Summer RR400 Check--Concrete.

Test#	Sensor Loc.	Load(lb)	RR400 Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	1200	1.59	2.19	27.4
2	1 ft.	1200	1.59	2.19	27.4
3	1 ft.	1800	----	VOID	----
4	1 ft.	1800	----	VOID	----
5	2 ft.	1200	0.91	1.46	37.6
6	2 ft.	1200	0.91	1.46	37.6
7	2 ft.	1200	0.91	1.34	32.1
8	2 ft.	1800	1.44	3.02	52.3
9	2 ft.	1800	1.44	3.35	57.0
10	3 ft.	1200	0.74	1.58	53.2
11	3 ft.	1200	0.74	1.58	53.2
12	3 ft.	1800	1.93	2.23	13.4
13	3 ft.	1800	1.93	2.23	13.4

Table All Summer FWD Check--Concrete.

Test#	Sensor Loc.	Load(KPa)	FWD Defl. (mils)	LVDT Defl. (mils)	% Diff.
1	1 ft.	414	3.42	3.25	-5.2
2	1 ft.	414	3.46	3.41	-1.5
3	1 ft.	414	3.50	3.59	2.5
4	1 ft.	890	7.95	8.18	2.8
5	1 ft.	890	7.91	8.18	3.3
6	1 ft.	890	7.91	8.08	2.1
7	3 ft.	414	1.69	1.46	-15.7
8	3 ft.	650	2.83	2.51	-12.7
9	3 ft.	650	2.83	2.55	-10.9
10	3 ft.	650	2.87	2.55	-12.5
11	3 ft.	900	3.90	3.53	-10.6
12	3 ft.	900	3.90	3.50	-11.4
13	3 ft.	900	3.94	3.53	-11.6
14	3 ft.	999	4.37	3.89	-12.3

deflection test data showed consistency.

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APPENDIX B - DESCRIPTION OF FLEXIBLE PAVEMENT TEST SECTIONS

Table B1 Description of Flexible Pavement Test Sections.

Section*	Co.	Route	General Description and Length	Test Section Description**
C-8	67	US 231	From south of I 70 northerly to Jct. US 40 - 2.97 mi.	From county road by power line tower (2.0 mi. south of Jct. US 40 & 1.6 mi. north of Jct. I 70) northerly (NB)
F-13	85	SR 114	From Fulton/Wabash Co. Line easterly 3.04 mi. - 3.04 mi.	From Fulton/Wabash Co. line easterly (in the town of Disko) (EB)
F-14	1	US 27	From Jct. SR 124 to 0.5 mi. south of Decatur C/L - 4.87 mi.	From CR 200N (3.9 mi. south of US 224 and 2.3 mi. north of SR 124) northerly (SB)
F-15	2	US 33	From 1.1 mi. southeast of Whitley/Allen Co. Line southeasterly - 1.29 mi.	From McDuffee Rd. (2.8 mi. south of SR 205) southeasterly (SB)
F-16	92	SR 114	From Wabash/Whitley Co. Line easterly 2.06 mi. - 2.06 mi.	From CR 850W (appr. 1.6 mi. east of Wabash/Whitley Co. Line and 1.6 mi. west of Jct. SR 105) easterly (EB)
F-17	1	US 27	From Adams/Allen Co. Line southerly 5.09 mi. (SOUTHBOUND lanes) - 5.09 mi.	From CR 900N (4.4 mi. south of Adams/Allen Co. Line and 2.65 mi. north of Decatur C/L) southerly in SOUTHBOUND lanes (SB)
F-18	52	US 31	From Miami/Fulton Co. Line southerly - 2.43 mi.	From Miami/Fulton Co. Line and CR 400S (4.8 mi. south of Jct. SR 25) southerly in SOUTHBOUND lanes (SB)
F-19	90	SR 1	From 3.15 mi. north of Jay/Wells Co. Line northerly to Bluffton C/L - 7.72 mi.	From CR 500S (1.0 mi. north of Jct. SR 218) southerly (SB)

Table B1, Continued.

Section	Co.	Route	General Description and Length	Test Section Description
L-10	64	SR 8	From Crooked Creek Bridge to the Porter/LaPorte Co. Line - 2.78 mi.	From 500′ east of CR 500E easterly (WB)
L-11	64	SR 8	From one mile east of Kouts to Crooked Creek Bridge - 0.74 mi.	From 1000′ west of Crooked Creek Bridge westerly (WB)
L-12	46	US 421	From south Jct. US 6 to north Jct. US 6 - 0.99 mi.	From entrance to Truck Transport and Redi-Mix plant northerly (north boundary is not painted) (NB)
L-13	25	SR 14	From 1.19 mi. west of Akron to 0.67 mi. west of Akron near Fulton/Kosciusko Co. Line - 0.52 mi.	From 0.15 mi. east of CR 1000E (CR 1000E is 1.4 mi. west of Jct. SR 19) easterly (WB)
L-14	66	US 421	From Jct. SR 114 northerly to Jct. SR 14 - 8.45 mi.	From CR 100S (CR 100S is 1.0 mi. south of no. Jct. SR 14) southerly to near the county schools (SB)
L-15	75	SR 10	From Jasper/Starke Co. Line to Jct. US 421 - 2.02 mi.	From 400′ west of CR 1100W westerly (WB)
L-16	37	SR 114	From 2.5 mi. east of Newton/Jasper Co. Line easterly - 2.26 mi.	From CR 700W easterly (located near Rensselaer) (EB)
L-17	37	SR 10	From Newton/Jasper Co. Line easterly - 4.02 mi.	From just east of I 65 easterly - appr. 0.3 mi. (EB)
S-8	31	US 150	From Washington/Harrison Co. Line to 1.0 mi. east of Jct. SR 135 - 3.46 mi.	From Buffalo Trace Park entrance (0.75 mi. east of Jct SR 135) westerly (EB)

Table B1, Continued.

Section	Co.	Route	General Description and Length	Test Section Description
S-9	69	US 421	From Jefferson/Ripley Co. Line to Jct. US 50 - 12.59 mi.	From CR 1050S (0.6 mi. north of Jefferson/Ripley Co. Line) northerly (NB)
S-10	16	SR 46	From Bartholomew/Decatur Co. Line to 0.5 mi. west of Jct. SR 3 - 6.50 mi.	From CR 600W (1.1 mi. west of Jct. SR 3) westerly (WB)
S-11	69	US 50	From east C/L of Versailles easterly 2.35 mi. to near Jct. SR 129 - 2.35 mi.	From 0.7 mi. east of Jct. US 421 easterly to near Versailles State Park entrance (WB)
S-12	10	SR 60	From east C/L of Borden easterly - 1.73 mi.	From 4.8 mi. east of Jct. SR 335 (at Scenic Valley Apts.) easterly (EB)
S-13	3	SR 46	From east C/L of Columbus City easterly to near Jct. SR 9 - 4.81 mi.	From 3.4 mi. west of Jct. SR 9 westerly to near the County Market (WB)
S-14	3	SR 9	From 0.03 mi. south of Shelby/Bartholomew Co. Line to appr. the town of Hope - 2.40 mi.	From 7.4 mi. north of Jct. SR 46 northerly to near CR 900N (NB)
S-15	10	SR 3	From Jct. SR 203 to Clark/Scott Co. Line - 0.72 mi.	From 3.9 mi. south of Jct. SR 356 southerly (between Jct. SR 362 and Jct. SR 203) (SB)
S-16	55	SR 135	From Brown/Morgan Co. Line to south C/L Morgantown - 1.91 mi.	From 0.8 mi. south of the West Jct. SR 252 southerly (skip culvert in the middle) - 0.2 mi. (SB)

Table B1, Continued.

Section	Co.	Route	General Description and Length	Test Section Description
V-6	19	US 231	From Spencer/Dubois Co. Line to so. C/L of Huntingburg - 5.15 mi.	From appr. 3.5 mi. no. of Jct. I 64 northerly to CR 900S (3.75 mi. south of Jct. SR 64 in Huntingburg) (SB)
V-7	19	US 231	From no. Huntingburg C/L northerly - 1.41 miles	From just south of the transmission lines (0.3 mi. no. of Huntingburg C/L) northerly to 0.3 mi. from beginning of the concrete (NB)
V-8	77	SR 154	From appr. 2.2 mi. west of Jct. SR 63 to appr. 3.0 mi. east of Jct. SR 63 (skip area around SR 63 in Graysville) - 4.95 mi.	From 0.75 mi. east of Jct. SR 63 easterly to county road next to white house & barn with tin roof (6.5 mi. west of US 41) (WB)
V-9	87	I 64	From just east of Jct. SR 61 easterly to Warrick/Spencer Co. Line (EASTBOUND LANES) - 14.58 mi.	Between MP 47 & 48 appr. 8 mi. east of Jct. SR 61 in EASTBOUND lanes (EB)
V-10	62	I 64	From Perry/Dubois Co. Line to 0.4 mi. east of Jct. SR 145 (EASTBOUND LANES) - 5.64 mi.	From 0.5 mi. east of Perry/Dubois Co. Line easterly (between MP 67 & 68) in EASTBOUND lanes (EB)

*C = Crawfordsville District, F = Fort Wayne, G = Greenfield, L = LaPorte, S = Seymour, V = Vincennes

**All test sections are approximately 0.25 mi. long, except where noted. Limits are yellow arrows painted on the pavement. Tests were run in the right wheel path of the outside lane (if more than 2-lane highway). The lane direction for the test is shown in parenthesis (NB = northbound, etc.).

Table B2 County Names and Corresponding Numbers.

County Name	No.	County Name	No.	County Name	No.
Adams	1	Hendricks	32	Pike	63
Allen	2	Henry	33	Porter	64
Bartholomew	3	Howard	34	Posey	65
Benton	4	Huntington	35	Pulaski	66
Blackford	5	Jackson	36	Putnam	67
Boone	6	Jasper	37	Randolph	68
Brown	7	Jay	38	Ripley	69
Carroll	8	Jefferson	39	Rush	70
Cass	9	Jennings	40	St.Joseph	71
Clark	10	Johnson	41	Scott	72
Clay	11	Knox	42	Shelby	73
Clinton	12	Kosciusko	43	Spencer	74
Crawford	13	Lagrange	44	Starke	75
Daviess	14	Lake	45	Steuben	76
Dearborn	15	LaPorte	46	Sullivan	77
Decatur	16	Lawrence	47	Switzerland	78
Dekalb	17	Madison	48	Tippecanoe	79
Delaware	18	Marion	49	Tipton	80
Dubois	19	Marshall	50	Union	81
Elkhart	20	Martin	51	Vanderburgh	82
Fayette	21	Miami	52	Vermillion	83
Floyd	22	Monroe	53	Vigo	84
Fountain	23	Montgomery	54	Wabash	85
Franklin	24	Morgan	55	Warren	86
Fulton	25	Newton	56	Warrick	87
Gibson	26	Noble	57	Washington	88
Grant	27	Ohio	58	Wayne	89
Greene	28	Orange	59	Wells	90
Hamilton	29	Owen	60	White	91
Hancock	30	Parke	61	Whitley	92
Harrison	31	Perry	62		

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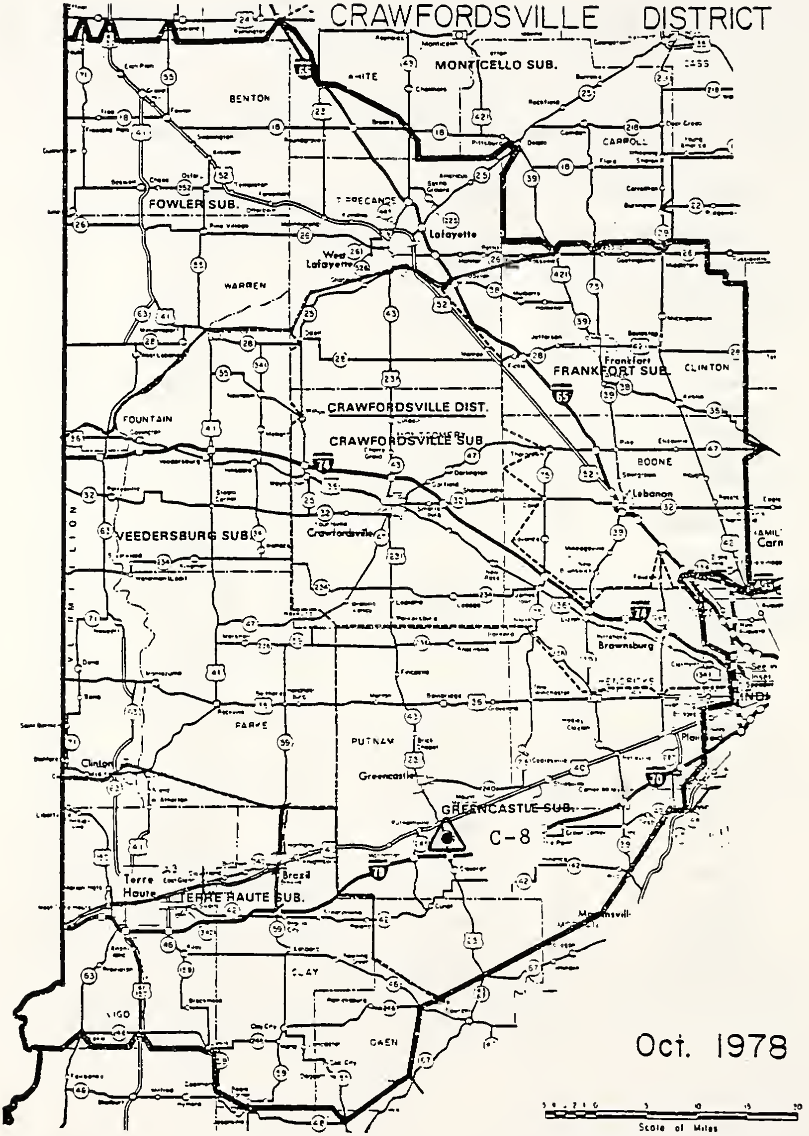

Figure B1 Flexible Test Section Locations in Crawfordsville District.

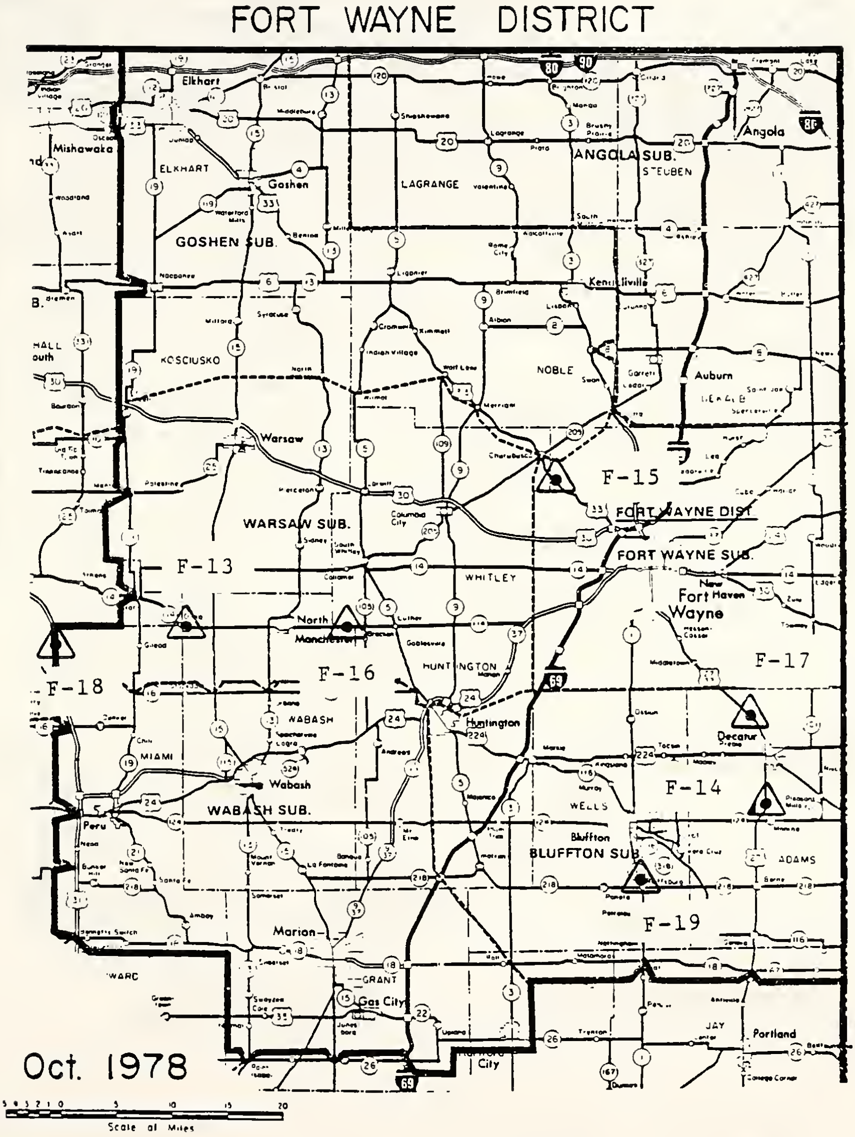

Figure B2 Flexible Test Section Locations in Fort Wayne District.

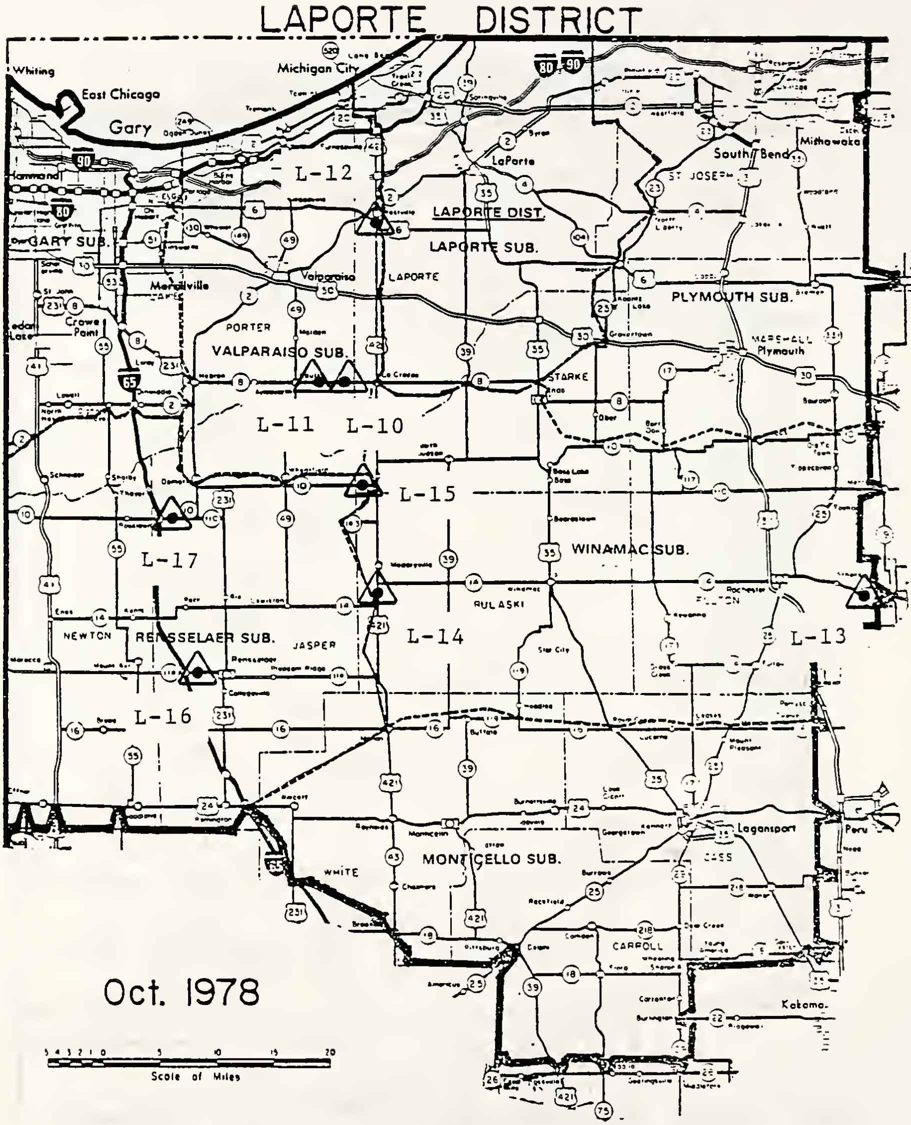

Figure B3 Flexible Test Section Locations in LaPorte District.

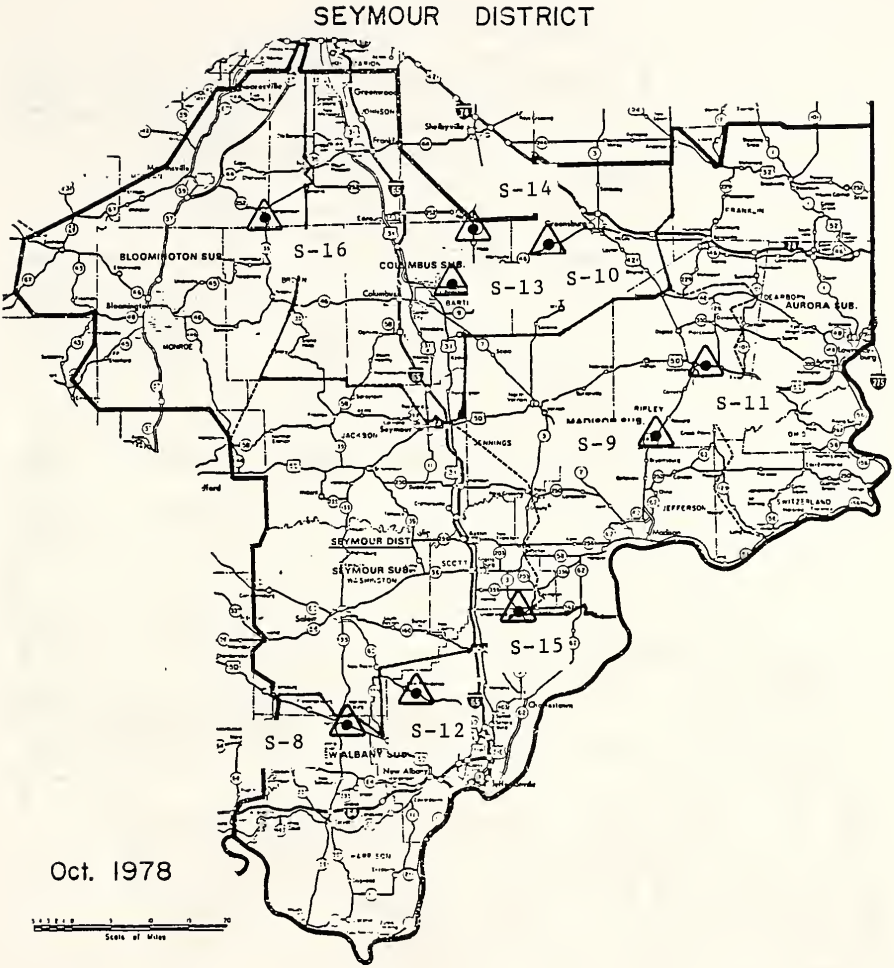

Figure B4 Flexible Test Section Locations in Seymour District.

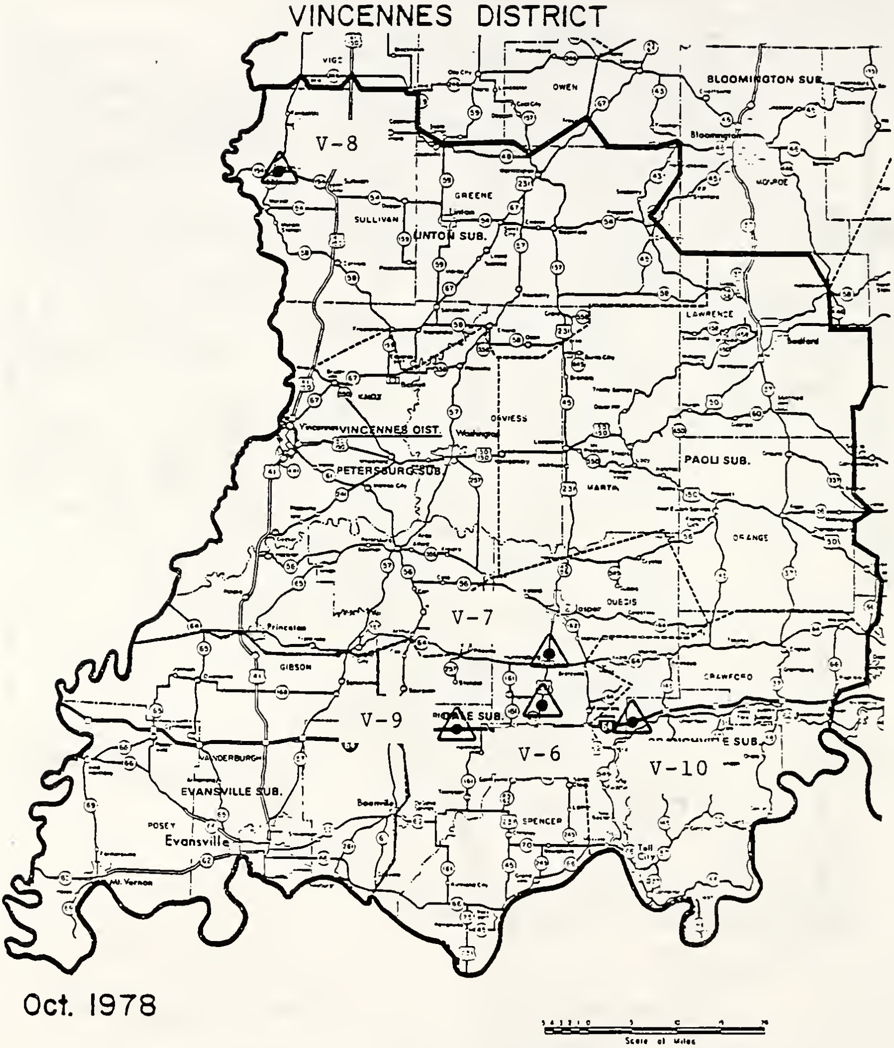

Figure B5 Flexible Test Section Locations in Vincennes District.

APPENDIX C - TESTING DATA BASE

A significant amount of data was collected during the 3-year duration of the overlay design study conducted for IDOH. The data base containing this data which follows includes complete information on section location, traffic, cross section, subgrade soil, climate zone, and deflection testing dates, times, temperatures, and values. A great deal of care was taken in organizing the data to facilitate accessing and manipulating the data. Note that the data is essentially free format for maximum flexibility. The complete set is also available on 5-1/4" floppy diskettes from the Transportation Area, School of Civil Engineering, Purdue University, West Lafayette, IN 47907.

Following is an entry-by-entry explanation of each value found in the data set:

Line No. 1 - Location, Traffic, and Climate Zone Data

Test Section Number (Entry 1). The test sections in each IDOH district (C = Crawfordsville, F = Fort Wayne, G = Greenfield, L = LaPorte, S = Seymour, and V = Vincennes) are numbered consecutively in the following order: CRCP, JRCP, and Asphalt.

County Number (Entry 2). This entry identifies the county in which the test section is located. The 92 counties are numbered consecutively in alphabetical order. Appendix B contains a list of corresponding county names and numbers.

Route Type (Entry 3). The route types (I = Interstate, US = United States, and SR = State Road) correspond to those used in route signing by the State of Indiana.

Route Number (Entry 4). The route numbers correspond to those used in route signing by the State of Indiana.

Average Annual Daily Traffic (AADT) (Entry 5). The IDOH Division of Planning maintains traffic information by highway. Each highway in each county is divided into several sections, and the AADT is determined for each section. The IDOH updates the traffic information for each route every three years.

Percent Trucks (Entry 6). This entry shows the percent of the AADT which is composed of trucks. Percent truck data was obtained from a Ph.D thesis by E.A. Sharaf titled "Analysis of Highway Maintenance Costs" (Purdue University, August 1984). Seventeen interstate and thirty-one primary rural highway counting sites were located in various counties throughout the state. At each of these stations, periodic traffic counts were made for both trucks and automobiles during several consecutive years. The percent trucks was calculated at each count station. This value was considered representative of all similar highway types throughout the county in which the station was located. In counties which had no count station, percent trucks was extrapolated or interpolated from adjacent counties or from counties with similar traffic and demographic characteristics.

Number of Trucks (Entry 7). This value was obtained by multiplying AADT by percent trucks on each test section.

Climate Zone (Entry 8). The state was divided into two climate zones (N = north and S = south). The dividing line begins near Kentland in the west and extends to near the Jay/Adams county line in the east. Factors included when determining this boundary include temperature, precipitation, and ground moisture.

Line No. 2 - General Pavement Section Data

General Section Description (Entry 1). A pavement section is considered to have the same cross section throughout its length. Sections were identified by construction or maintenance contract number found in Road Life Records, Division of Planning, IDOH. A 1250′ test section was selected within the boundaries of this general section. A list of definitions of the abbreviations used in the descriptions follows:

F. = From
CL = county line
C/L = city limit
NB = northbound
EB = eastbound
SB = southbound
WB = westbound
m. = miles
n. = north
e. = east
s. = south
w. = west
se. = southeast
CR = county road

Length of the General Section (Entry 2). The length is given in miles.

Line No. 3 - Pavement Test Section Data

Test Section Description (Entry 1). The location of each pavement test section is described. Deflection, condition, serviceability, traffic, subgrade, and climate data for this project were collected on each section. Definitions of abbreviations are the same as listed in the General Section Description.

Length of Test Section (Entry 2). The length is given in miles and is approximately 0.25 miles for every test section.

Line No. 4 - Pavement Cross Section Data

Cross Section Type (Entry 1). A number from 1 to 7 is shown.

1 = bituminous pavement
2 = asphalt on JRCP
3 = asphalt on JPCP
4 = asphalt on CRCP
5 = non-overlaid JRCP
6 = non-overlaid JPCP
7 = non-overlaid CRCP

Contract Number (Entry 2). This contract number is the one under which the newest overlay was constructed.

Year Construction Ended (Entry 3). Listed are the last two digits of the year in which the contract for the newest overlay was completed.

Age of Newest Overlay (Entry 4). Testing during this study was conducted in 1986. The overlay age is calculated by subtracting the year construction ended from 1986. If no overlay has been placed on the original pavement, this value is the age of the original pavement.

Latest Overlay Thickness (Entry 5). The thicknesses shown for the newest asphaltic concrete overlay are in inches. If a pavement has not been overlaid, zero is shown.

Ratio of Newest Overlay Thickness to Total Pavement Thickness (Entry 6). Total pavement thickness consists of the sum of all asphaltic thicknesses which have been placed in the test section. Total thickness does not include granular base or subbase. The ratio is zero for all flexible pavements. (This factor was not used in the analysis of data for AC pavements; thus, it was not calculated.)

Thickness of Asphaltic Concrete Base (Entry 7). Asphaltic concrete "base" consists of all AC which is under the newest AC overlay in bituminous pavements. Thicknesses listed are in inches. A value of zero is shown when no (AC) base is present.

Portland Cement Concrete Thickness (Entry 8). For all composite pavements and PC pavements, these thicknesses are shown in inches. A value of zero appears when the pavement cross section is AC.

Subbase Thickness (Entry 9). The thicknesses of subbase under the AC or PCC pavements are given in inches. Zero is shown if the pavement lies directly on the subgrade.

Subbase Type (Entry 10). For subbase type, the following code was used:

G = granular

BS = bituminous stabilized

N = none present

Line No. 5 - Subgrade Data

Three-inch shelby tubes were pushed into the subgrade through a six-inch core holes in each of the pavement test sections. From this sample, sieve analyses, Atterberg limit, dry unit weight, moisture content, and specific gravity tests were conducted to ascertain the following data shown in this line of the data base:

AASHTO Soil Classification (Entry 1).

AASHTO Soil Group Index (Entry 2).

Unified Soil Classification (Entry 3).

Dry Unit Weight (Entry 4).

In-place Moisture Content (Entry 5).

Estimated CBR (%) (Entry 6). See the "Thickness Design for Concrete Highway and Street Pavements", Portland Cement Association, 1984, p. 7. The two soil classifications were used to estimate the CBR values.

Liquid Limit (Entry 7).

Plastic Limit (Entry 8).

Plasticity Index (Entry 9).

Specific Gravity (Entry 10).

Line No. 6 - Condition, Performance, and Skid Measurements

Condition Rating (Entry 1). Pavement condition was quantified using the pavement maintenance management system (PAVER) developed by M.D. Shahin and S.D. Kohn for the U.S. Army Corps of Engineers and discussed in Technical Report M-294, "Pavement Maintenance Management for Roads and Parking Lots", USACE-CERL, October 1981.

Serviceability Measurement (Entry 2). The IDOH Research and Training Center measures roughness of Indiana highway pavements on a three year cycle using the Portland Cement Association (PCA) Roadmeter. The roughness values obtained are converted to Present Serviceability Index (PSI) using a regression equation relating these roughness values to PSI.

Skid Number (Entry 3). The IDOH Research and Training Center yearly quantifies skid characteristics of Indiana highway pavements using a skid trailer.

Line No. 7 - Number of Days of Testing

Deflection measurement were made during two testing periods - spring and summer/fall. Because of equipment malfunctions, not all test sections were tested by all NDT deflection testing devices on the same day. This line has one entry showing the total number of days in the combined spring and summer/fall testing sessions that deflection testing was performed on a pavement test section.

Line No. 8 - Testing Dates, Times, Temperatures, and Devices Used

Date of Test (Entry 1).

Equipment Used (Entries 2 through 5). Four NDT devices were used during the pavement testing. The use of the Dynaflect, Road Rater 400 (RR400), Road Rater 2000 (RR2000), and Dynatest Falling Weight Deflectometer (FWD) at a test section on a particular day may be ascertained from the second, third, fourth, and fifth entries, respectively, on this data line. A "1" as an entry indicates that a device was used, and a "0" indicates that it was not. For example, the entry "1 0 1 0" as the second through fifth entries would show that the Dynaflect and the RR2000 were used on a test section on the date shown.

Beginning and Ending Times of Testing (Entries 6 and 7).

All times shown are in military time.

Pavement Surface Temperatures (Entries 8 through 10). Pavement temperatures in degrees-Fahrenheit were measured at different times throughout the deflection testing. A maximum of three measurements were made. A zero is placed in remaining entries if fewer than three temperature measurements were taken.

Air Temperature (Entry 11). A thermometer was placed in the shade away from the pavement at the test site to obtain the air temperature in degrees-Fahrenheit.

Five-day Average Air Temperature (Entry 12). The average temperature for the five days before the test day was calculated by adding the high and low temperatures for all five days and dividing by ten. This value was used in obtaining the temperature correction factor for the deflection values. Deflections were converted to equivalent deflections at 70 degrees-F. Temperature information was obtained from the climatological data published by the National Oceanic and Atmospheric Administration (NOAA).

Line No. 9 - First NDT Deflection Device

The name of the device for which deflection data is about to be listed is named.

Lines 10, etc. - Deflection Data

Raw, pre-temperature-corrected data obtained from each NDT deflection testing device which was used on a given day is given. Unique amounts of data were recorded for each NDT device; thus each line has entries of different data types:

> Dynaflect - site no., location of loading site, load magnitude, frequency magnitude, and deflections at sensors 0, 1, 2, 3, and 4.
>
> Road Raters 400 and 2000 - site no., load no., frequency no., location of loading site, load magnitude, frequency magnitude, and deflections at sensors 0, 1, 2, and 3.
>
> Dynatest FWD - site number, load number, location of loading site, load magnitude, and deflections at sensors 0, 1, 2, 3, 4, 5, and 7.

More detailed descriptions of the data line entries follow.

Site Number. Each test section was tested at six locations, or sites, within the section. On some JRCP test sections, a seventh site was added at a joint. The sites are numbered consecutively in the order that testing was performed.

Load Number. Load imparted to the pavement may be varied by several of the devices. These loads are numbered consecutively from lowest to highest.

Frequency Number. When frequency of loading could be varied, the frequencies were numbered consecutively from low to high.

Location of Loading Site. On jointed concrete pavements, the test sites were generally located in the right wheel path at mid-slab or at a joint. On bituminous and CRC pavements, the location of these sites was random. The following entries are made based upon location:

0 = not applicable
1 = adjacent to joint
2 = mid-slab

Load Magnitude. The load magnitude for the Dynaflect and Road Raters are listed in kips of force. Kilopascals (kPa) are the units for the FWD loading. The circular plate through which the FWD load is imparted has a diameter of 300mm.

Frequency Magnitude The frequency of the loading is shown in Hz.

Deflection at Sensor No. 0. This deflection sensor is located at the center of loading for each device. The remaining sensors are numbered according to their distance in feet from sensor no. 0 (or the load center). They radiate from the load center at one-foot intervals, except for sensor no. 7 which is two feet from sensor no. 5 for the FWD; there is no sensor no. 6. The deflection values shown for all sensors for the Dynaflect and Road Raters are in milli-inches, or mils. The FWD deflection values are in microns.

Deflection at Sensor No. 1.

Deflection at Sensor No. 2.

Deflection at Sensor No. 3.

Deflection at Sensor No. 4.

Deflection at Sensor No. 5.

Deflection at Sensor No. 7.

Once deflection information is completed for a given day, lines 8 and after are repeated for the next test date on that test section. When all deflection data has been listed for a test section, the process is repeated from line 1 for the next section.

```
"C8"   67  "US"  231   6040  17.0   1027  "S"
"F. s. of I70 northerly to US40"    4.05
"F. road @ power line tower (2.0m. s. of US40) northerly (NB)"      0.25
1  13468  82   4  2.0   0.00  13.5   0.0  14.4  "6"
"A-7-6"  10  "CL"      106.4  21.1   9  40.8  17.8  23.0  2.70
 94  3.6  0
2
"03 27-86"  1  1  0  1  0815  0845   37    0    0  35  45
"Dynaflect"
   1  0  1.0  8  0.62  0.49  0.37  0.30  0.19
   2  0  1.0  8  0.54  0.40  0.29  0.23  0.14
   3  0  1.0  8  0.53  0.39  0.28  0.21  0.13
   4  0  1.0  8  0.53  0.39  0.29  0.24  0.15
   5  0  1.0  8  0.43  0.31  0.23  0.19  0.12
   6  0  1.0  8  0.37  0.26  0.19  0.17  0.10
"Road Rater 400"
   1  1  2  0  0.60   24.9    0.61    0.33    0.55    1.31
   1  2  2  0  1.24   24.9    1.37    0.61    1.11    1.54
   1  3  2  0  1.83   24.9    1.54    1.97    2.15    2.75
   2  1  2  0  0.58   24.9    0.36    0.18    1.76    0.45
   2  2  2  0  1.22   24.9    0.82    0.69    2.14    2.37
   2  3  2  0  1.82   25.0    1.38    1.21    1.04    2.42
   3  1  2  0  0.63   25.2    0.49    0.32    1.80    0.49
   3  2  2  0  1.26   25.3    1.06    1.05    1.47    1.46
   3  3  2  0  1.87   25.3    2.11    2.02    0.73    1.27
   4  1  2  0  0.61   25.2    0.39    0.14    0.68    0.20
   4  2  2  0  1.25   25.3    0.81    0.76    0.90    0.47
   4  3  2  0  1.85   25.3    1.71    1.55    1.29    2.75
   5  1  2  0  0.60   25.2    0.25    0.12    0.24    0.10
   5  2  2  0  1.22   25.3    0.57    1.13    2.35    0.29
   5  3  2  0  1.88   25.3    1.24    1.07    0.82    2.90
   6  1  1  0  0.62   15.4    0.24    0.17    0.13    0.34
   6  2  1  0  1.23   15.0    0.51    0.37    0.34    1.12
   6  1  2  0  0.61   25.2    0.27    0.22    0.19    0.07
   6  2  2  0  1.26   25.2    0.66    0.62    1.50    0.39
   6  3  2  0  1.84   25.2    1.38    1.34    1.15    2.75
   6  1  3  0  0.58   35.1    0.16    0.11    0.03    0.04
   6  2  3  0  1.18   35.1    0.38    0.27    0.24    0.18
   6  3  3  0  1.67   35.1    1.48    2.47    4.39    4.79
"Dynatest FWD"
   1  2  0  461  151  114   90   58   40    0    0
   1  4  0  945  312  245  184  127   91    0    0
   2  2  0  456  132  106   74   49   34    0    0
   2  4  0  948  278  223  162  108   74    0    0
   3  2  0  456  135  106   77   50   35    0    0
   3  4  0  945  280  224  161  112   77    0    0
   4  2  0  454  126  104   74   53   37    0    0
   4  4  0  945  270  221  163  117   84    0    0
   5  2  0  455  109   83   63   41   31    0    0
   5  4  0  945  225  177  133   93   67    0    0
   6  1  0  219   46   33   27   15   13    0    0
   6  2  0  445   98   79   53   35   25    0    0
   6  3  0  689  149  118   86   55   41    0    0
   6  4  0  948  205  164  122   77   57    0    0
"08-12-86"  1  1  1  1  1205  1235   99  101  110  77  69
"Dynaflect"
   1  0  1.0  8  0.67  0.52  0.35  0.24  0.16
   2  0  1.0  8  0.58  0.42  0.27  0.17  0.11
   3  0  1.0  8  0.56  0.40  0.25  0.17  0.11
   4  0  1.0  8  0.60  0.44  0.29  0.20  0.13
   5  0  1.0  8  0.43  0.31  0.22  0.16  0.12
   6  0  1.0  8  0.37  0.25  0.17  0.13  0.09
"Road Rater 400"
   1  1  2  0  0.61   25.2    0.62    0.48    0.34    0.22
   1  2  2  0  1.24   25.2    1.40    1.26    0.84    0.57
   1  3  2  0  1.84   25.2    2.43    2.04    1.44    1.09
   2  1  2  0  0.62   25.2    0.49    0.38    0.27    0.16
   2  2  2  0  1.23   25.2    1.23    0.91    0.68    0.42
   2  3  2  0  1.83   25.2    2.05    1.56    1.10    0.67
   3  1  2  0  0.61   25.2    0.66    0.64    0.32    0.33
   3  2  2  0  1.24   25.3    1.59    1.39    0.87    0.82
   3  3  2  0  1.85   25.2    2.66    3.40    1.46    1.34
   4  1  2  0  0.59   24.9    0.58    0.49    0.36    0.27
   4  2  2  0  1.21   25.0    1.42    1.25    0.90    0.67
   4  3  2  0  1.84   25.0    2.30    2.01    1.43    1.06
   5  1  2  0  0.59   25.0    0.34    0.28    0.19    0.13
   5  2  2  0  1.22   25.0    0.88    0.72    0.48    0.36
   5  3  2  0  1.81   25.0    1.44    1.20    0.78    0.56
   6  1  1  0  0.61   15.0    0.27    0.25    0.14    0.09
   6  2  1  0  1.26   15.1    0.68    0.57    0.35    0.23
   6  1  2  0  0.59   24.8    0.39    0.23    0.23    0.18
   6  2  2  0  1.21   24.9    0.94    0.60    0.58    0.47
   6  3  2  0  1.80   24.9    1.53    1.25    0.91    0.75
   6  1  3  0  0.60   35.1    0.28    0.19    0.12    0.08
   6  2  3  0  1.18   35.0    0.82    0.60    0.36    0.25
   6  3  3  0  1.80   35.1    1.41    1.05    0.64    0.45
"Road Rater 2000"
   1  1  2  0  0.57   25.0    0.49    0.34    0.28    0.20
   1  2  2  0  1.21   25.0    1.15    0.81    0.61    0.44
   1  3  2  0  1.83   25.0    1.82    1.27    0.94    0.66
   1  4  2  0  2.41   25.0    2.57    1.80    1.33    0.91
   1  5  2  0  3.63   25.0    4.31    2.99    2.14    1.44
   2  1  2  0  0.58   25.0    0.47    0.31    0.24    0.18
   2  2  2  0  1.17   25.0    1.01    0.66    0.46    0.32
   2  3  2  0  1.82   25.0    1.60    1.06    0.73    0.51
   2  4  2  0  2.42   25.0    2.29    1.50    1.01    0.69
   2  5  2  0  3.61   25.0    3.74    2.47    1.61    1.08
   3  1  2  0  0.56   24.9    0.62    0.46    0.44    0.29
   3  2  2  0  1.18   25.0    1.35    1.03    0.93    0.66
   3  3  2  0  1.83   25.0    2.16    1.61    1.31    0.99
   3  4  2  0  2.42   25.0    3.02    2.30    1.71    1.37
   3  5  2  0  3.60   25.0    4.85    3.64    2.60    2.09
   4  1  2  0  0.59   25.0    0.52    0.37    0.30    0.25
   4  2  2  0  1.18   25.0    1.11    0.84    0.65    0.50
   4  3  2  0  1.76   24.9    1.73    1.30    1.01    0.78
   4  4  2  0  2.40   25.0    2.56    1.90    1.46    1.10
   4  5  2  0  3.58   25.0    4.18    2.98    2.25    1.68
   5  1  2  0  0.60   25.0    0.49    0.24    0.18    0.15
   5  2  2  0  1.24   25.0    0.99    0.51    0.39    0.31
   5  3  2  0  1.79   25.0    1.53    0.81    0.59    0.47
   5  4  2  0  2.44   25.0    2.19    1.14    0.84    0.64
   5  5  2  0  3.64   25.0    3.41    1.84    1.33    0.99
   6  1  1  0  0.60   15.2    0.32    0.20    0.15    0.13
   6  2  1  0  1.23   15.2    0.66    0.41    0.31    0.23
   6  3  1  0  1.79   15.2    1.08    0.67    0.47    0.36
   6  4  1  0  2.38   15.3    1.53    0.96    0.65    0.48
   6  5  1  0  3.63   15.2    2.54    1.55    1.10    0.77
   6  1  2  0  0.61   25.1    0.39    0.29    0.24    0.21
   6  2  2  0  1.17   25.1    0.79    0.57    0.46    0.38
   6  3  2  0  1.80   25.1    1.25    0.89    0.73    0.60
   6  4  2  0  2.41   25.1    1.75    1.24    1.00    0.81
   6  5  2  0  3.62   25.1    2.73    1.94    1.53    1.23
   6  1  3  0  0.62   35.2    0.26    0.16    0.13    0.13
   6  2  3  0  1.23   35.2    0.55    0.33    0.25    0.19
   6  3  3  0  1.83   35.2    0.83    0.52    0.37    0.28
   6  4  3  0  2.43   35.2    1.19    0.73    0.51    0.39
   6  5  3  0  3.63   35.2    1.98    1.19    0.82    0.61
"Dynatest FWD"
   1  2  0  387  232  153   93   55   35   26   22
   1  4  0  815  467  324  204  121   79   59   38
   2  2  0  385  206  138   81   45   27    0    0
   2  4  0  812  426  295  180  107   64    0    0
   3  2  0  383  213  141   80   46   31   21   12
   3  4  0  808  422  290  177  109   70   51   27
   4  2  0  381  211  139   87   54   33    0    0
   4  4  0  804  435  299  193  123   80    0    0
   5  2  0  382  157   99   57   40   26   22   15
   5  4  0  806  314  203  128   91   62   47   32
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  380  131   78   49   33   26    0    0
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     6  3  0  590  196  122   77   51   40    0    0
     6  4  0  806  265  168  108   74   58    0    0



"F13"  83  "SR"  114   1750  25.0    438  "N"
"F. Fulton/Wabash CL easterly"    3.04
"F. Fulton/Wabash CL easterly in Disko (EB)"    0.25
1   8561  71  15  1.9   0.00   5.6   0.0  15.6  "6"
"A-2-4"   0  "SM"     118.2  11.0  38   0.0   0.0   0.0  2.68
 64  2.5  0
2
"04-02-86"  1  1  1  1  1340  1410   77    0    0  60  58
"Dynaflect"
   1  0  1.0  8  0.89  0.67  0.44  0.28  0.16
   2  0  1.0  8  1.01  0.65  0.36  0.20  0.12
   3  0  1.0  8  1.19  0.81  0.48  0.29  0.18
   4  0  1.0  8  1.24  0.81  0.46  0.26  0.15
   5  0  1.0  8  1.25  0.77  0.42  0.24  0.14
   6  0  1.0  8  1.16  0.73  0.40  0.23  0.14
"Road Rater 400"
   1  1  2  0  0.62   25.2   0.81   0.71   0.49   0.31
   1  2  2  0  1.24   25.2   2.32   1.58   1.09   0.71
   1  3  2  0  1.88   25.2   3.03   2.78   2.00   1.32
   2  1  2  0  0.62   25.2   0.96   0.67   0.96   0.20
   2  2  2  0  1.25   25.2   2.06   1.47   0.93   0.44
   2  3  2  0  1.86   25.2   3.88   2.72   1.92   0.78
   3  1  2  0  0.61   25.2   0.99   0.68   0.46   0.25
   3  2  2  0  1.23   25.2   2.22   1.40   1.86   1.05
   3  3  2  0  1.89   25.3   4.32   3.08   1.98   3.06
   4  1  2  0  0.62   25.2   1.18   0.91   0.47   0.28
   4  2  2  0  1.24   25.2   2.55   2.31   1.00   0.58
   4  3  2  0  1.89   25.3   4.71   3.71   1.87   1.89
   5  1  2  0  0.62   25.2   1.09   1.07   0.96   0.25
   5  2  2  0  1.24   25.2   2.30   2.03   0.86   0.50
   5  3  2  0  1.86   25.3   4.56   3.14   1.66   0.97
   6  1  1  0  0.65   15.2   0.92   0.57   0.32   0.17
   6  2  1  0  1.23   15.3   2.05   1.26   0.69   0.66
   6  1  2  0  0.61   25.1   1.09   0.72   0.41   0.13
   6  2  2  0  1.22   25.1   2.36   1.49   0.87   0.89
   6  3  2  0  1.85   25.1   4.45   3.00   1.36   1.00
   6  1  3  0  0.60   35.2   0.86   0.55   0.19   0.07
   6  2  3  0  1.19   35.1   2.17   1.43   0.83   0.51
   6  3  3  0  1.80   35.2   4.96   3.29   1.82   0.95
"Road Rater 2000"
   1  1  2  0  0.60   25.2   0.66   0.51   0.37   0.26
   1  2  2  0  1.21   25.2   1.46   1.10   0.77   0.55
   1  3  2  0  1.80   25.0   2.26   1.72   1.17   0.83
   1  4  2  0  2.40   25.0   3.18   2.44   1.65   1.17
   1  5  2  0  3.58   25.0   5.29   4.02   2.79   1.89
   2  1  2  0  0.61   25.1   0.84   0.48   0.28   0.16
   2  2  2  0  1.19   25.0   1.82   1.01   0.59   0.34
   2  3  2  0  1.78   25.0   3.04   1.70   0.96   0.54
   2  4  2  0  2.39   25.0   4.49   2.50   1.37   0.78
   2  5  2  0  3.62   25.0   7.91   4.52   2.36   1.30
   3  1  2  0  0.60   25.0   0.83   0.57   0.36   0.25
   3  2  2  0  1.18   25.0   1.88   1.33   0.86   0.55
   3  3  2  0  1.80   25.0   3.35   2.34   1.44   0.93
   3  4  2  0  2.37   25.0   4.96   3.46   2.09   1.34
   3  5  2  0  3.58   25.0   9.32   6.46   3.85   2.36
   4  1  2  0  0.62   25.1   0.96   0.59   0.37   0.24
   4  2  2  0  1.20   25.0   2.13   1.31   0.77   0.50
   4  3  2  0  1.81   25.0   3.53   2.19   1.24   0.78
   4  4  2  0  2.40   25.0   5.16   3.18   1.78   1.09
   4  5  2  0  3.62   25.0   9.40   5.62   3.03   1.80
   5  1  2  0  0.59   25.0   0.93   0.52   0.26   0.20
   5  2  2  0  1.19   25.0   2.14   1.21   0.62   0.43
   5  3  2  0  1.82   25.1   3.67   2.07   1.07   0.69
   5  4  2  0  2.38   25.0   5.24   3.01   1.50   0.95
   5  5  2  0  3.59   25.0     9.73     5.55     3.00     1.61
   6  1  1  0  0.59   15.1     0.86     0.48     0.33     0.18
   6  2  1  0  1.23   15.0     1.96     1.07     0.68     0.38
   6  3  1  0  1.80   15.0     3.27     1.85     1.09     0.60
   6  4  1  0  2.39   15.0     4.80     2.80     1.52     0.86
   6  5  1  0  3.58   15.0     9.38     5.36     2.80     1.52
   6  1  2  0  0.59   25.1     0.91     0.52     0.35     0.22
   6  2  2  0  1.19   25.1     2.04     1.21     0.75     0.48
   6  3  2  0  1.81   25.1     3.44     2.01     1.16     0.75
   6  4  2  0  2.40   25.1     4.95     2.90     1.69     1.05
   6  5  2  0  3.60   25.1     8.81     5.15     2.71     1.74
   6  1  3  0  0.62   35.1     0.87     0.50     0.30     0.20
   6  2  3  0  1.20   35.1     1.90     1.10     0.64     0.42
   6  3  3  0  1.81   35.1     3.23     1.87     1.03     0.67
   6  4  3  0  2.41   35.1     4.68     2.74     1.47     0.94
   6  5  3  0  3.61   35.1     8.18     4.80     2.47     1.53
"Dynatest FWD"
   1  2  0 438  285  214  135   80   48    0    0
   1  4  0 920  637  477  310  180  108    0    0
   2  2  0 425  455  269  126   55   36    0    0
   2  4  0 905  946  605  287  129   77    0    0
   3  2  0 426  527  342  171   89   52    0    0
   3  4  0 905 1080  716  385  194  111    0    0
   4  2  0 420  531  327  156   72   42    0    0
   4  4  0 896 1060  677  345  167   94    0    0
   5  2  0 414  542  353  148   69   42   34   20
   5  4  0 900 1145  736  343  149   91    0    0
   6  1  0 192  197  135   48   29   17    0    0
   6  2  0 420  508  285  131   63   41    0    0
   6  3  0 649  717  436  197  101   67    0    0
   6  4  0 900  975  587  270  139   87    0    0
"08-26-86"  1  1  0  1  0830  0855   82   83   78  75  69
"Dynaflect"
   1  0  1.0  8  0.67  0.52  0.34  0.22  0.15
   2  0  1.0  8  0.74  0.48  0.28  0.17  0.10
   3  0  1.0  8  0.84  0.57  0.35  0.23  0.15
   4  0  1.0  8  0.92  0.60  0.34  0.20  0.13
   5  0  1.0  8  0.82  0.56  0.33  0.20  0.13
   6  0  1.0  8  0.77  0.51  0.30  0.19  0.12
"Road Rater 400"
   1  1  2  0  0.60   25.0     0.64     0.92     1.19     2.93
   1  2  2  0  1.20   25.0     1.40     1.20     1.48     3.57
   1  3  2  0  1.82   25.1     2.51     2.16     3.06     6.67
   2  1  2  0  0.58   25.0     0.71     0.50     0.28     0.34
   2  2  2  0  1.21   25.0     1.64     1.13     0.62     0.64
   2  3  2  0  1.79   25.0     2.96     2.01     1.05     2.23
   3  1  2  0  0.60   25.0     0.84     0.59     0.38     0.18
   3  2  2  0  1.22   25.0     1.91     1.37     0.83     0.43
   3  3  2  0  1.83   25.1     3.64     2.58     1.54     0.94
   4  1  2  0  0.59   25.0     0.94     0.65     0.36     0.48
   4  2  2  0  1.20   25.0     2.25     1.53     0.83     1.53
   4  3  2  0  1.82   25.1     4.17     2.81     1.47     3.76
   5  1  2  0  0.59   25.0     0.81     0.56     0.34     0.35
   5  2  2  0  1.21   25.0     1.89     1.28     0.76     0.44
   5  3  2  0  1.81   25.1     3.43     2.31     1.32     0.98
   6  1  1  0  0.60   15.0     0.57     0.46     0.19     0.25
   6  2  1  0  1.20   15.1     1.38     1.14     0.70     1.20
   6  1  2  0  0.60   25.1     0.78     0.48     0.26     0.22
   6  2  2  0  1.22   25.1     1.86     1.14     0.76     0.38
   6  3  2  0  1.81   25.1     3.44     2.39     1.35     0.18
   6  1  3  0  0.60   35.1     0.68     0.46     0.28     0.26
   6  2  3  0  1.21   35.0     1.90     1.29     0.82     0.81
   6  3  3  0  1.80   35.1     4.97     2.69     1.75     1.13
"Dynatest FWD"
   1  2  0   395   257  182  111   63   41   29   16
   1  4  0   922   619  450  278  157  102   66   41
   2  2  0   391   399  219  100   47   28    0    0
   2  4  0   907   863  528  260  122   74    0    0
   3  2  0   386   476  294  144   76   46   32   19
   3  4  0   892   1047 693  363  189  110   76   49
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 4  2  0  382  488  271  119   58   35    0    0
 4  4  0  895  1020 626  300  148   89    0    0
 5  2  0  334  405  242  114   59   37   27   17
 5  4  0  902  902  585  296  140   90   68   44
 6  1  0    0    0    0    0    0    0    0    0
 6  2  0  382  381  213  104   54   35    0    0
 6  3  0  612  567  339  166   88   57    0    0
 6  4  0  899  785  479  243  131   85    0    0



"F14"   1  "US"   27   6000  27.5   1650  "N"
"F. SR124 to 0.5m. s. of Decatur C/L"    4.87
"F. CR200N (2.3m. n. of SR124) northerly (SB)"    0.25
1  12840  81   5  0.8   0.00   9.5   0.0  19.2  "6"
"A-7-6"  13  "CL"     108.7  21.4   9  42.3  20.3  22.0  2.69
 68  3.5  0
2
"04-08-86"  1  1  1  1  1010  1040   71    0    0  55  59
"Dynaflect"
   1  0  1.0  8  1.04  0.77  0.50  0.33  0.21
   2  0  1.0  8  1.08  0.86  0.61  0.42  0.28
   3  0  1.0  8  0.92  0.74  0.54  0.39  0.27
   4  0  1.0  8  0.93  0.74  0.54  0.39  0.27
   5  0  1.0  8  1.00  0.79  0.56  0.40  0.27
   6  0  1.0  8  0.98  0.75  0.53  0.37  0.25
"Road Rater 400"
   1  1  2  0  0.57   24.2    0.85    1.82    0.55    0.36
   1  2  2  0  1.24   25.0    2.49    2.17    1.32    0.95
   1  3  2  0  1.81   25.0    3.35    1.96    2.27    1.66
   2  1  2  0  0.60   25.0    0.83    0.50    0.55    0.43
   2  2  2  0  1.20   25.0    1.85    1.84    1.22    0.96
   2  3  2  0  1.80   25.0    3.24    2.82    2.16    1.61
   3  1  2  0  0.61   25.0    0.73    0.52    0.51    0.39
   3  2  2  0  1.23   25.0    1.62    1.41    1.12    0.89
   3  3  2  0  1.79   25.0    2.74    3.40    1.42    1.47
   4  1  2  0  0.60   25.0    0.73    0.76    0.38    0.42
   4  2  2  0  1.21   25.0    1.66    1.58    0.83    0.96
   4  3  2  0  1.83   25.0    2.81    2.85    1.97    1.46
   5  1  2  0  0.59   25.0    0.75    0.62    0.31    0.38
   5  2  2  0  1.22   25.0    1.73    1.15    1.25    0.89
   5  3  2  0  1.81   25.0    2.50    2.79    1.87    1.48
   6  1  1  0  0.62   15.2    0.68    0.56    0.43    0.43
   6  2  1  0  1.24   15.2    1.58    1.24    0.85    0.87
   6  1  2  0  0.60   24.9    0.84    0.72    0.52    0.42
   6  2  2  0  1.24   25.1    2.01    1.40    1.12    0.91
   6  3  2  0  1.82   25.1    3.57    2.62    2.31    1.20
   6  1  3  0  0.61   35.3    0.66    0.57    0.29    0.25
   6  2  3  0  1.21   35.0    1.58    1.35    0.64    0.60
   6  3  3  0  1.81   35.0    3.57    2.68    1.47    0.89
"Road Rater 2000"
   1  1  2  0  0.63   25.0    0.84    0.61    0.44    0.33
   1  2  2  0  1.17   25.0    1.82    1.30    0.93    0.68
   1  3  2  0  1.80   25.0    2.97    2.13    1.50    1.10
   1  4  2  0  2.41   25.0    4.29    3.07    2.23    1.53
   1  5  2  0  3.61   25.0    7.22    5.15    3.72    2.50
   2  1  2  0  0.59   25.0    0.75    0.62    0.48    0.37
   2  2  2  0  1.16   25.0    1.63    1.41    1.05    0.80
   2  3  2  0  1.79   25.0    2.72    2.32    1.70    1.28
   2  4  2  0  2.43   25.0    3.89    3.30    2.38    1.77
   2  5  2  0  3.59   25.0    6.55    5.47    3.86    2.77
   3  1  2  0  0.59   25.0    0.73    0.59    0.49    0.39
   3  2  2  0  1.20   24.9    1.64    1.31    1.05    0.82
   3  3  2  0  1.80   25.0    2.55    2.02    1.62    1.27
   3  4  2  0  2.42   25.0    3.78    2.90    2.28    1.76
   3  5  2  0  3.60   25.0    6.06    4.70    3.65    2.78
   4  1  2  0  0.56   25.1    0.77    0.58    0.49    0.38
   4  2  2  0  1.19   25.1    1.83    1.38    1.06    0.87
   4  3  2  0  1.80   25.1    2.88    2.17    1.67    1.37
   4  4  2  0  2.42   25.1     3.94     3.00     2.29     1.86
   4  5  2  0  3.61   25.1     6.42     4.78     3.66     2.87
   5  1  2  0  0.62   25.1     0.85     0.61     0.50     0.39
   5  2  2  0  1.19   25.1     1.89     1.33     1.09     0.83
   5  3  2  0  1.79   25.1     3.03     2.15     1.74     1.29
   5  4  2  0  2.41   25.1     4.10     3.04     2.41     1.79
   5  5  2  0  3.58   25.1     5.56     5.09     3.93     2.86
   6  1  1  0  0.59   15.0     0.62     0.46     0.39     0.23
   6  2  1  0  1.16   15.0     1.44     1.05     0.86     0.50
   6  3  1  0  1.81   15.0     2.46     1.80     1.41     0.78
   6  4  1  0  2.44   15.0     3.59     2.59     1.95     1.09
   6  5  1  0  3.60   14.9     6.47     4.72     3.14     1.87
   6  1  2  0  0.65   24.9     0.77     0.57     0.43     0.31
"Dynatest FWD"
   1  2  0  416  354  243  145   83   53    0    0
   1  4  0  922  726  512  318  192  120    0    0
   2  2  0  414  338  264  162   98   63    0    0
   2  4  0  925  718  538  349  216  137    0    0
   3  2  0  417  283  214  143   92   62    0    0
   3  4  0  913  614  456  301  205  131    0    0
   4  2  0  417  263  209  134   91   59    0    0
   4  4  0  917  573  430  294  195  130    0    0
   5  2  0  415  334  237  144   88   58   41   26
   5  4  0  916  701  501  321  191  129   91   55
   6  1  0  217  150  119   69   40   26    0    0
   6  2  0  407  342  244  144   83   53    0    0
   6  3  0  647  533  390  235  139   85    0    0
   6  4  0  921  725  537  332  194  119    0    0
"08-28-86"  1  1  0  1  1033  1059   82   82   77  63  70
"Dynaflect"
   1  0  1.0  8  0.69  0.55  0.39  0.27  0.18
   2  0  1.0  8  0.80  0.66  0.48  0.36  0.23
   3  0  1.0  8  0.74  0.64  0.47  0.35  0.23
   4  0  1.0  8  0.75  0.62  0.47  0.35  0.25
   5  0  1.0  8  0.76  0.64  0.48  0.37  0.24
   6  0  1.0  8  0.71  0.57  0.42  0.31  0.21
"Road Rater 400"
   1  1  2  0  0.60   25.1     0.72     0.58     0.43     0.16
   1  2  2  0  1.19   25.0     1.59     1.31     0.95     0.48
   1  3  2  0  1.80   25.1     2.88     2.27     1.73     1.23
   2  1  2  0  0.58   25.0     0.68     0.60     0.48     0.38
   2  2  2  0  1.20   25.0     1.56     1.43     1.17     0.92
   2  3  2  0  1.82   25.1     2.73     2.46     1.99     1.54
   3  1  2  0  0.58   25.0     0.64     0.60     0.49     0.35
   3  2  2  0  1.22   25.1     1.55     1.62     1.12     0.90
   3  3  2  0  1.81   25.1     2.58     2.72     2.09     1.46
   4  1  2  0  0.58   25.0     0.71     0.63     0.51     0.39
   4  2  2  0  1.19   25.1     1.69     1.45     1.25     1.01
   4  3  2  0  1.82   25.1     2.97     1.90     2.17     1.91
   5  1  2  0  0.59   25.0     0.68     0.59     0.48     0.37
   5  2  2  0  1.21   25.0     1.61     1.45     1.19     0.95
   5  3  2  0  1.78   25.1     2.68     2.67     1.95     1.57
   6  1  1  0  0.60   15.0     0.46     0.47     0.30     0.21
   6  2  1  0  1.19   15.1     1.12     1.03     0.74     0.53
   6  1  2  0  0.58   25.0     0.59     0.48     0.37     0.23
   6  2  2  0  1.21   25.0     1.40     1.21     0.92     0.70
   6  3  2  0  1.80   25.1     2.47     1.27     1.59     2.60
   6  1  3  0  0.59   35.0     0.49     0.48     0.28     0.75
   6  2  3  0  1.21   35.1     1.22     1.01     0.76     0.85
   6  3  3  0  1.80   35.1     2.62     3.76     1.63     0.00
"Dynatest FWD"
   1  2  0  407  322  212  118   73   46   28   20
   1  4  0  921  677  468  287  177  112   74   45
   2  2  0  406  294  212  137   87   55    0    0
   2  4  0  921  635  473  316  203  133    0    0
   3  2  0  410  264  190  127   85   57   38   24
   3  4  0  926  585  437  297  197  132   89   52
   4  2  0  408  257  187  127   84   57    0    0
   4  4  0  923  539  426  292  197  130    0    0
   5  2  0  406  288  207  127   81   57   42   21
   5  4  0  916  634  474  304  198  132   93   55
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  402  287  193  117   73   47    0    0
   6  3  0  628  438  312  193  118   75    0    0
   6  4  0  914  623  458  290  180  114    0    0



"F15"   2  "US"   33   7430  27.5   2043  "N"
"F. 1.1m. se. of Whitley/Allen CL southeasterly"     1.29
"F. McDuffee Rd. (2.8m. s. of SR205) southeasterly (SB)"    0.25
1  10652  76  10  1.6   0.00   7.1   0.0  13.0  "G"
"A-6"     9  "CL"     101.3   6.8  11  32.4  19.2  13.2  2.65
  0  2.9  0
2
"04-03-86"  1  1  1  1  1125  1200   54    0    0  50  60
"Dynaflect"
   1  0  1.0  8  0.99  0.70  0.45  0.26  0.14
   2  0  1.0  8  0.88  0.67  0.47  0.32  0.20
   3  0  1.0  8  1.05  0.79  0.56  0.36  0.22
   4  0  1.0  8  0.95  0.77  0.58  0.41  0.27
   5  0  1.0  8  1.03  0.82  0.61  0.41  0.27
   6  0  1.0  8  0.82  0.62  0.43  0.28  0.17
"Road Rater 400"
   1  1  2  0  0.61   25.0    0.91    0.57    0.46    0.28
   1  2  2  0  1.23   25.0    1.90    1.45    0.97    0.57
   1  3  2  0  1.83   25.0    3.32    3.06    1.68    1.41
   2  1  2  0  0.59   24.9    0.71    0.56    0.42    0.28
   2  2  2  0  1.22   25.0    1.53    1.03    0.62    0.59
   2  3  2  0  1.82   25.0    2.61    2.04    2.94    1.02
   3  1  2  0  0.60   24.9    0.81    0.69    1.47    0.33
   3  2  2  0  1.22   25.0    1.75    0.75    2.15    0.69
   3  3  2  0  1.84   25.0    3.20    1.71    3.29    1.32
   4  1  2  0  0.59   24.9    0.70    0.50    0.44    0.30
   4  2  2  0  1.22   25.0    1.52    1.34    0.99    0.69
   4  3  2  0  1.84   25.0    2.62    1.71    1.73    1.21
   5  1  2  0  0.60   24.9    0.73    0.85    0.28    0.29
   5  2  2  0  1.24   25.0    1.57    0.77    1.76    0.68
   5  3  2  0  1.82   25.0    2.67    1.62    2.20    1.18
   6  1  1  0  0.61   15.3    0.56    0.44    0.30    0.19
   6  2  1  0  1.27   15.3    1.29    1.01    0.69    0.16
   6  1  2  0  0.61   25.1    0.65    0.52    0.36    0.20
   6  2  2  0  1.24   25.2    1.41    1.45    0.78    0.73
   6  3  2  0  1.86   25.2    2.46    1.60    1.38    1.52
   6  1  3  0  0.57   35.1    0.54    0.42    0.22    0.19
   6  2  3  0  1.18   35.1    1.32    1.05    0.61    0.50
   6  3  3  0  1.82   35.2    2.94    2.38    1.25    0.98
"Road Rater 2000"
   1  1  2  0  0.59   25.0    0.63    0.46    0.29    0.20
   1  2  2  0  1.18   25.0    1.40    1.02    0.66    0.42
   1  3  2  0  1.83   25.0    2.32    1.66    1.05    0.68
   1  4  2  0  2.38   25.0    3.32    2.40    1.53    0.95
   1  5  2  0  3.64   25.0    5.73    4.18    2.64    1.61
   2  1  2  0  0.62   24.9    0.65    0.43    0.28    0.21
   2  2  2  0  1.17   25.0    1.36    0.92    0.58    0.46
   2  3  2  0  1.79   25.0    2.18    1.44    0.91    0.69
   2  4  2  0  2.40   25.0    3.02    2.05    1.31    0.98
   2  5  2  0  3.59   25.0    5.14    3.41    2.31    1.58
   3  1  2  0  0.62   25.1    0.78    0.60    0.44    0.31
   3  2  2  0  1.19   25.1    1.65    1.24    0.90    0.62
   3  3  2  0  1.80   25.1    2.71    2.02    1.47    1.00
   3  4  2  0  2.39   25.1    3.84    2.89    2.09    1.38
   3  5  2  0  3.59   25.1    6.82    4.91    3.50    2.26
   4  1  2  0  0.60   25.1    0.56    0.47    0.36    0.26
   4  2  2  0  1.20   25.1    1.19    0.98    0.73    0.54
   4  3  2  0  1.78   25.1    1.81    1.52    1.14    0.86
   4  4  2  0  2.39   25.1    2.57    2.15    1.61    1.19
   4  5  2  0  3.59   25.1    4.12    3.44    2.59    1.90
   5  1  2  0  0.61   25.1    0.67    0.49    0.38    0.25
   5  2  2  0  1.19   25.1     1.42     1.06     0.76     0.54
   5  3  2  0  1.30   25.1     2.33     1.74     1.22     0.85
   5  4  2  0  2.38   24.9     3.31     2.44     1.70     1.17
   5  5  2  0  3.60   25.1     5.56     4.16     2.91     1.95
   6  1  1  0  0.61   15.0     0.50     0.41     0.33     0.20
   6  2  1  0  1.20   15.0     1.10     0.89     0.67     0.42
   6  3  1  0  1.78   14.9     1.83     1.45     1.08     0.65
   6  4  1  0  2.39   14.9     2.60     2.08     1.60     0.91
   6  5  1  0  3.65   14.9     4.99     3.60     2.19     1.53
   6  1  2  0  0.59   25.1     0.56     0.40     0.37     0.20
   6  2  2  0  1.16   25.1     1.24     0.92     0.67     0.44
   6  3  2  0  1.80   25.1     2.06     1.48     0.98     0.69
   6  4  2  0  2.41   25.1     2.93     2.11     1.37     0.97
   6  5  2  0  3.59   25.1     4.93     3.48     2.35     1.56
   6  1  3  0  0.61   35.1     0.60     0.44     0.30     0.22
   6  2  3  0  1.24   35.1     1.35     0.93     0.66     0.47
   6  3  3  0  1.84   35.1     2.22     1.55     1.08     0.75
   6  4  3  0  2.43   35.1     3.13     2.19     1.51     1.04
   6  5  3  0  3.59   35.1     5.31     3.67     2.52     1.71
"Dynatest FWD"
   1  2  0  429  374  280  163   88   45    0    0
   1  4  0  892  769  579  359  198  107    0    0
   2  2  0  428  256  204  135   81   50    0    0
   2  4  0  906  557  427  293  180  113    0    0
   3  2  0  426  326  268  167  102   59    0    0
   3  4  0  896  697  550  368  223  135    0    0
   4  2  0  423  237  201  147   94   64    0    0
   4  4  0  899  523  441  319  216  145    0    0
   5  2  0  420  268  230  154   98   62   39   24
   5  4  0  888  581  488  345  221  144   90   57
   6  1  0  209  120   86   63   31   22    0    0
   6  2  0  416  256  196  125   73   46    0    0
   6  3  0  644  405  313  201  121   76    0    0
   6  4  0  893  559  433  280  173  108    0    0
"08-27-86"  1  1  0  1  0845  0920   55   62   65  61  67
"Dynaflect"
   1  0  1.0  8  0.69  0.50  0.31  0.18  0.11
   2  0  1.0  8  0.72  0.56  0.38  0.26  0.17
   3  0  1.0  8  0.87  0.69  0.47  0.31  0.20
   4  0  1.0  8  0.74  0.62  0.45  0.32  0.23
   5  0  1.0  8  0.72  0.60  0.44  0.33  0.23
   6  0  1.0  8  0.65  0.51  0.34  0.23  0.15
"Road Rater 400"
   1  1  2  0  0.60   25.1     0.77     0.73     0.37     0.24
   1  2  2  0  1.20   25.1     1.60     1.93     0.78     1.40
   1  3  2  0  1.80   24.9     2.90     2.92     1.34     4.29
   2  1  2  0  0.59   25.1     0.58     0.46     0.33     0.39
   2  2  2  0  1.19   25.0     1.26     1.09     0.70     2.04
   2  3  2  0  1.78   25.1     2.30     1.90     1.33     2.94
   3  1  2  0  0.59   25.0     0.64     0.52     0.38     0.25
   3  2  2  0  1.20   25.0     1.36     1.12     0.80     0.55
   3  3  2  0  1.81   25.0     2.77     2.36     1.66     4.96
   4  1  2  0  0.58   25.0     0.58     0.46     0.26     0.20
   4  2  2  0  1.22   25.1     1.23     1.07     0.54     0.67
   4  3  2  0  1.80   25.0     2.37     1.82     3.02     1.15
   5  1  2  0  0.59   25.0     0.59     0.48     0.34     0.20
   5  2  2  0  1.22   25.1     1.39     1.13     0.85     2.00
   5  3  2  0  1.80   25.1     2.64     3.46     1.59     5.88
   6  1  1  0  0.60   15.1     0.47     0.31     0.22     0.13
   6  2  1  0  1.21   15.1     1.16     0.80     0.58     0.37
   6  1  2  0  0.60   25.1     0.57     0.34     0.28     0.23
   6  2  2  0  1.19   25.1     1.26     0.73     0.62     0.57
   6  3  2  0  1.78   25.0     2.46     1.81     1.25     1.93
   6  1  3  0  0.60   35.1     0.59     0.34     0.23     0.30
   6  2  3  0  1.21   35.1     1.50     0.88     0.58     0.61
   6  3  3  0  1.80   35.1     3.47     3.40     5.83     1.19
"Dynatest FWD"
   1  2  0  409  297  206  119   64   33   22   15
   1  4  0  925  638  465  282  153   80   51   37
   2  2  0  407  241  168  108   65   41    0    0
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 2  4  0  922  521  380  250  155   97    0    0
 3  2  0  402  279  211  134   76   49   35   22
 3  4  0  910  636  500  326  192  122   84   55
 4  2  0  405  217  170  122   79   51    0    0
 4  4  0  908  500  400  289  193  126    0    0
 5  2  0  398  228  177  118   75   47   37   20
 5  4  0  902  523  413  288  180  117   82   44
 6  1  0    0    0    0    0    0    0    0    0
 6  2  0  399  220  159  101   57   37    0    0
 6  3  0  614  342  255  161   97   59    0    0
 6  4  0  901  502  375  240  147   89    0    0



"F16"  92  "SR"  114   2196  25.0    549  "N"
"F. Wabash/Whitley CL easterly"    2.06
"F. CR850W (1.6m. w. of SR105) easterly (EB)"    0.25
1   6264  64  22  3.1   0.00   3.1   0.0  12.0  "G"
"A-6"     8  "CL"      116.3  14.9  11  30.7  15.6  15.2  2.74
 39  2.6  0
2
"04-02-86"  1  1  1  1  1500  1530   75    0    0  65  57
"Dynaflect"
   1  0  1.0  8  1.21  0.89  0.55  0.31  0.17
   2  0  1.0  8  1.18  0.89  0.57  0.33  0.18
   3  0  1.0  8  1.23  0.90  0.53  0.28  0.13
   4  0  1.0  8  1.34  0.96  0.57  0.30  0.14
   5  0  1.0  8  1.37  0.95  0.52  0.25  0.10
   6  0  1.0  8  1.16  0.85  0.53  0.31  0.16
"Road Rater 400"
   1  1  2  0  0.59   25.0     1.14     0.87     0.60     0.77
   1  2  2  0  1.23   25.0     2.45     3.43     1.31     1.50
   1  3  2  0  1.84   25.1     4.37     4.12     2.38     2.85
   2  1  2  0  0.86   29.7     1.10     0.89     1.09     0.64
   2  2  2  0  1.22   25.0     2.33     1.87     0.66     0.74
   2  3  2  0  1.83   25.0     4.21     3.44     2.02     2.45
   3  1  2  0  0.59   25.0     1.18     0.81     0.57     0.37
   3  2  2  0  1.24   25.1     2.42     2.12     1.13     0.85
   3  3  2  0  1.83   25.1     4.34     3.26     2.04     2.02
   4  1  2  0  0.61   25.0     1.20     0.86     0.33     0.25
   4  2  2  0  1.21   25.0     2.57     1.69     1.52     0.44
   4  3  2  0  1.85   25.0     4.94     3.48     2.72     1.16
   5  1  2  0  0.60   25.0     1.17     0.94     0.85     0.45
   5  2  2  0  1.24   25.0     2.67     2.61     1.17     1.45
   5  3  2  0  1.87   25.1     4.96     1.49     2.30     1.88
   6  1  1  0  0.62   15.1     0.82     0.56     0.34     0.66
   6  2  1  0  1.24   15.2     1.85     1.26     0.79     1.55
   6  1  2  0  0.60   25.0     1.02     0.74     0.51     0.29
   6  2  2  0  1.23   25.1     2.15     2.17     1.06     0.63
   6  3  2  0  1.85   25.1     4.06     1.90     2.54     1.32
   6  1  3  0  0.59   35.0     1.19     0.77     0.55     0.46
   6  2  3  0  1.18   35.0     2.99     2.22     1.46     1.18
   6  3  3  0  1.77   35.0     6.29     5.46     3.18     2.49
"Road Rater 2000"
   1  1  2  0  0.57   25.1     0.88     0.61     0.41     0.27
   1  2  2  0  1.20   25.1     2.01     1.42     0.89     0.59
   1  3  2  0  1.79   25.1     3.18     2.28     1.40     0.92
   1  4  2  0  2.38   25.1     4.55     3.26     2.05     1.29
   1  5  2  0  3.61   25.1     7.77     5.60     3.49     2.18
   2  1  2  0  0.58   25.1     0.89     0.68     0.42     0.28
   2  2  2  0  1.16   25.1     1.91     1.48     0.93     0.60
   2  3  2  0  1.78   25.1     3.17     2.47     1.53     0.99
   2  4  2  0  2.41   25.1     4.56     3.53     2.19     1.38
   2  5  2  0  3.60   25.1     7.70     5.95     3.72     2.33
   3  1  2  0  0.58   25.1     0.91     0.68     0.32     0.21
   3  2  2  0  1.21   25.1     2.08     1.51     0.73     0.47
   3  3  2  0  1.80   25.1     3.34     2.36     1.22     0.75
   3  4  2  0  2.41   25.1     4.68     3.20     1.76     1.03
   3  5  2  0  3.61   25.1     8.18     5.41     3.26     1.76
   4  1  2  0  0.58   25.1     0.94     0.67     0.42     0.23
   4  2  2  0  1.17   25.1     2.13     1.50     0.94     0.52
   4  3  2  0  1.83   25.1     3.58     2.53     1.57     0.86
   4  4  2  0  2.41   25.1     5.11     3.60     2.24     1.19
   4  5  2  0  3.59   25.1     8.87     6.28     3.88     2.08
   5  1  2  0  0.61   25.1     1.08     0.72     0.39     0.17
   5  2  2  0  1.21   25.1     2.28     1.53     0.87     0.35
   5  3  2  0  1.82   25.1     3.78     2.53     1.48     0.60
   5  4  2  0  2.40   25.1     5.41     3.64     2.10     0.87
   5  5  2  0  3.60   25.0     9.81     6.47     3.76     1.70
   6  1  1  0  0.61   15.1     0.80     0.53     0.45     0.21
   6  2  1  0  1.21   15.1     1.82     1.17     0.97     0.41
   6  3  1  0  1.79   15.1     3.02     1.88     1.53     0.69
   6  4  1  0  2.41   15.1     4.62     2.86     2.18     0.96
   6  5  1  0  3.61   15.1     7.47     5.14     3.12     1.76
   6  1  2  0  0.60   25.1     0.92     0.64     0.36     0.28
   6  2  2  0  1.18   25.1     1.97     1.35     0.76     0.56
   6  3  2  0  1.80   25.0     3.21     2.20     1.25     0.87
   6  4  2  0  2.41   25.1     4.59     3.11     1.85     1.22
   6  5  2  0  3.58   25.1     7.64     5.10     3.11     1.93
   6  1  3  0  0.63   35.1     1.17     0.83     0.56     0.39
   6  2  3  0  1.22   35.1     2.46     1.74     1.20     0.83
   6  3  3  0  1.81   35.0     3.99     2.81     1.92     1.31
   6  4  3  0  2.42   35.1     5.68     4.05     2.77     1.87
   6  5  3  0  3.60   35.1    10.08     6.77     4.71     3.12
"Dynatest FWD"
   1  2  0  410  414  324  201  116   63    0    0
   1  4  0  879  910  705  455  261  148    0    0
   2  2  0  412  424  322  197  113   60    0    0
   2  4  0  874  931  707  451  262  143    0    0
   3  2  0  403  453  354  217  119   58    0    0
   3  4  0  870 1025  803  509  288  147    0    0
   4  2  0  404  517  370  214  114   58    0    0
   4  4  0  880 1140  837  514  286  149    0    0
   5  2  0  399  564  397  210  102   43   20   14
   5  4  0  875 1253  900  513  259  118   48   35
   6  1  0  193  148  111   79   41   26    0    0
   6  2  0  404  375  278  178  105   61    0    0
   6  3  0  635  613  459  297  178  103    0    0
   6  4  0  873  866  651  426  259  150    0    0
"08-26-86"  1  1  0  1  1055  1130   79   79   80  77  68
"Dynaflect"
   1  0  1.0  8  0.77  0.59  0.38  0.23  0.13
   2  0  1.0  8  0.77  0.58  0.39  0.24  0.14
   3  0  1.0  8  0.73  0.57  0.34  0.18  0.10
   4  0  1.0  8  0.83  0.60  0.35  0.20  0.11
   5  0  1.0  8  0.91  0.65  0.37  0.20  0.09
   6  0  1.0  8  0.79  0.60  0.39  0.24  0.14
"Road Rater 400"
   1  1  2  0  0.60   25.1     0.84     0.68     0.44     0.24
   1  2  2  0  1.21   25.1     1.78     1.45     0.92     0.56
   1  3  2  0  1.81   25.2     3.13     2.62     1.69     1.04
   2  1  2  0  0.59   25.0     0.75     0.57     0.38     0.17
   2  2  2  0  1.21   25.0     1.63     1.74     0.81     0.52
   2  3  2  0  1.79   25.0     2.93     2.39     1.46     1.33
   3  1  2  0  0.60   25.0     0.78     0.48     0.34     0.26
   3  2  2  0  1.20   25.0     1.67     1.09     0.72     0.63
   3  3  2  0  1.79   25.0     2.86     1.92     1.18     1.00
   4  1  2  0  0.60   25.0     0.83     0.55     0.36     0.15
   4  2  2  0  1.22   25.0     1.80     1.32     0.76     0.34
   4  3  2  0  1.78   25.0     3.00     2.20     1.15     0.60
   5  1  2  0  0.59   25.0     0.88     0.60     0.38     0.15
   5  2  2  0  1.20   25.0     1.96     1.45     0.81     0.30
   5  3  2  0  1.81   25.0     3.61     2.66     1.44     0.58
   6  1  1  0  0.61   15.1     0.58     0.47     0.26     0.43
   6  2  1  0  1.20   15.1     1.32     0.99     0.61     0.47
   6  1  2  0  0.59   25.1     0.74     0.56     0.38     0.19
   6  2  2  0  1.20   25.0     1.63     1.22     0.78     0.37
   6  3  2  0  1.80   25.0     2.84     2.20     1.36     0.61
   6  1  3  0  0.60   35.1     0.78     0.61     0.43     0.12
   6  2  3  0  1.20   35.1    1.37    1.47    1.02    0.59
   6  3  3  0  1.80   35.0    4.19    3.29    2.22    1.41
"Dynatest FWD"
   1  2  0  388  327  224  135   76   45   25   12
   1  4  0  390  765  547  337  198  113   71   33
   2  2  0  383  316  221  140   77   46    0    0
   2  4  0  983  747  546  350  204  116    0    0
   3  2  0  380  309  223  131   71   37   21   20
   3  4  0  882  747  552  346  189  101   53   25
   4  2  0  384  352  235  139   80   39    0    0
   4  4  0  885  837  598  365  211  110    0    0
   5  2  0  380  418  276  153   77   39   19   08
   5  4  0  871 1007  703  415  220  106   45   19
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  379  292  215  136   81   46    0    0
   6  3  0  600  483  361  232  138   79    0    0
   6  4  0  878  721  543  355  214  122    0    0



"F17"   1  "US"   27   8900  27.5   2448  "N"
"F. Adams/Allen CL southerly"   5.09
"F. CR900N (4.4m. s. of Adams/Allen CL) southerly (S8)"    0.25
1  10576  78   8  2.7   0.00  12.8   0.0   0.0  "N"
"A-6"    12  "CL"     111.4  18.0  10  37.7  18.0  19.7  2.73
 80  2.8  0
2
"04-08-86"  1  1  1  1  0900  0930   63    0    0  50  59
"Dynaflect"
   1  0  1.0  8  0.46  0.41  0.34  0.28  0.22
   2  0  1.0  8  0.49  0.43  0.35  0.28  0.21
   3  0  1.0  8  0.65  0.57  0.46  0.36  0.26
   4  0  1.0  8  0.54  0.47  0.38  0.32  0.25
   5  0  1.0  8  0.42  0.37  0.31  0.26  0.20
   6  0  1.0  8  0.49  0.43  0.35  0.29  0.22
"Road Rater 400"
   1  1  2  0  0.56   24.2    0.29    0.09    0.53    0.19
   1  2  2  0  1.19   24.7    0.67    1.52    0.67    0.45
   1  3  2  0  1.83   25.1    1.14    1.35    0.95    0.81
   2  1  2  0  0.61   25.1    0.37    0.88    0.29    0.20
   2  2  2  0  1.26   25.2    0.79    0.52    0.62    0.56
   2  3  2  0  1.84   25.2    1.29    0.82    1.04    1.07
   3  1  2  0  0.61   25.1    0.54    0.86    0.68    0.24
   3  2  2  0  1.23   25.1    1.10    0.94    2.08    0.56
   3  3  2  0  1.83   25.2    1.91    0.88    1.69    0.93
   4  1  2  0  0.60   24.9    0.31    0.82    0.22    0.15
   4  2  2  0  1.20   25.0    0.64    1.46    0.49    0.39
   4  3  2  0  1.82   25.0    2.49    1.25    0.82    0.68
   5  1  2  0  0.60   25.0    0.24    0.27    0.17    0.13
   5  2  2  0  1.21   25.0    0.50    0.58    0.37    0.29
   5  3  2  0  1.80   25.0    0.81    0.45    0.63    0.51
   6  1  1  0  0.66   15.7    0.34    0.31    0.33    0.20
   6  2  1  0  1.31   15.6    0.72    0.68    0.70    0.46
   6  1  2  0  0.60   25.1    0.30    0.22    0.07    0.15
   6  2  2  0  1.22   25.1    0.60    0.44    0.12    0.36
   6  3  2  0  1.82   25.1    1.00    0.70    0.55    0.60
   6  1  3  0  0.59   35.0    0.24    0.13    0.15    0.11
   6  2  3  0  1.19   34.9    0.53    0.31    0.37    0.30
   6  3  3  0  1.81   35.0    1.02    0.67    0.76    0.58
"Road Rater 2000"
   1  1  2  0  0.59   25.2    0.31    0.26    0.23    0.18
   1  2  2  0  1.21   25.0    0.68    0.55    0.48    0.40
   1  3  2  0  1.80   25.0    1.02    0.83    0.71    0.61
   1  4  2  0  2.41   25.0    1.39    1.13    0.97    0.84
   1  5  2  0  3.63   25.0    2.22    1.78    1.48    1.32
   2  1  2  0  0.61   25.0    0.34    0.31    0.25    0.20
   2  2  2  0  1.23   25.0    0.73    0.68    0.52    0.40
   2  3  2  0  1.85   25.0    1.14    1.06    0.82    0.63
   2  4  2  0  2.43   25.0    1.54    1.40    1.08    0.84
   2  5  2  0  3.57   25.0    2.32    2.15    1.56    1.29
   3  1  2  0  0.62   25.0    0.44    0.35    0.33    0.23
   3  2  2  0  1.22   25.0    0.90    0.72    0.66    0.45
   3  3  2  0  1.80   25.0    1.37    1.09    0.98    0.68
   3  4  2  0  2.41   25.0    1.91    1.52    1.38    0.94
   3  5  2  0  3.57   25.0    2.90    2.34    2.14    1.46
   4  1  2  0  0.61   25.0    0.30    0.25    0.22    0.18
   4  2  2  0  1.20   25.0    0.63    0.53    0.46    0.38
   4  3  2  0  1.78   25.0    0.95    0.78    0.68    0.56
   4  4  2  0  2.45   25.0    1.29    1.08    0.95    0.77
   4  5  2  0  3.65   25.0    2.00    1.66    1.44    1.19
   5  1  2  0  0.57   25.0    0.23    0.22    0.16    0.13
   5  2  2  0  1.23   25.0    0.50    0.40    0.34    0.26
   5  3  2  0  1.84   25.0    0.72    0.58    0.49    0.40
   5  4  2  0  2.39   25.0    0.96    0.78    0.66    0.53
   5  5  2  0  3.60   25.0    1.71    1.20    1.02    0.83
   6  1  1  0  0.61   14.8    0.27    0.29    0.21    0.16
   6  2  1  0  1.21   15.0    0.60    0.62    0.48    0.39
   6  3  1  0  1.85   15.0    0.90    1.01    0.76    0.60
   6  4  1  0  2.39   14.9    1.28    1.38    1.04    0.80
   6  5  1  0  3.57   15.0    1.83    2.06    1.55    1.18
   6  1  2  0  0.62   25.0    0.28    0.26    0.21    0.15
   6  2  2  0  1.23   25.0    0.54    0.53    0.41    0.31
   6  3  2  0  1.75   25.0    0.81    0.77    0.62    0.45
   6  4  2  0  2.41   25.0    1.09    1.06    0.34    0.61
   6  5  2  0  3.61   25.0    1.55    1.55    1.23    0.93
   6  1  3  0  0.59   35.2    0.22    0.18    0.17    0.14
   6  2  3  0  1.21   35.1    0.47    0.39    0.33    0.25
   6  3  3  0  1.81   35.1    0.71    0.56    0.49    0.36
   6  4  3  0  2.41   35.1    0.93    0.77    0.66    0.49
   6  5  3  0  3.63   35.1    1.37    1.20    0.98    0.74
"Dynatest FWD"
   1  2  0  450  102   92   78   63   50    0    0
   1  4  0  934  228  197  166  137  108    0    0
   2  2  0  439  100   93   77   58   45    0    0
   2  4  0  932  233  203  166  130   99    0    0
   3  2  0  439  130  122   96   72   53    0    0
   3  4  0  927  314  264  209  155  115    0    0
   4  2  0  430  104   95   77   62   49    0    0
   4  4  0  922  238  201  164  131  105    0    0
   5  2  0  427   79   68   58   44   36   29   17
   5  4  0  929  181  154  126  101   78   62   37
   6  1  0  198   42   39   29   22   17    0    0
   6  2  0  425   98   84   66   51   39    0    0
   6  3  0  662  156  129  103   79   61    0    0
   6  4  0  920  218  179  142  110   84    0    0
"08-28-86"  1  1  0  1  0900  0930   66   68   59  53  71
"Dynaflect"
   1  0  1.0  8  0.39  0.35  0.30  0.24  0.18
   2  0  1.0  8  0.42  0.37  0.32  0.25  0.18
   3  0  1.0  8  0.55  0.49  0.40  0.31  0.22
   4  0  1.0  8  0.44  0.39  0.33  0.27  0.20
   5  0  1.0  8  0.35  0.32  0.27  0.22  0.16
   6  0  1.0  8  0.41  0.36  0.30  0.24  0.18
"Road Rater 400"
   1  1  2  0  0.60   25.0    0.33    0.26    0.29    0.21
   1  2  2  0  1.22   25.1    0.71    2.65    1.47    0.52
   1  3  2  0  1.82   25.1    1.19    2.85    2.13    0.88
   2  1  2  0  0.58   25.1    0.33    0.26    2.72    0.19
   2  2  2  0  1.20   25.1    0.71    1.02    1.49    0.48
   2  3  2  0  1.79   25.1    1.17    1.24    6.46    4.58
   3  1  2  0  0.58   25.0    0.42    1.02    0.31    0.23
   3  2  2  0  1.22   25.1    0.95    0.90    0.73    0.57
   3  3  2  0  1.81   25.1    1.54    1.45    1.18    2.16
   4  1  2  0  0.59   25.0    0.30    0.26    1.59    0.16
   4  2  2  0  1.20   25.1    0.68    0.62    1.61    0.42
   4  3  2  0  1.81   25.1    1.10    1.03    1.38    0.70
   5  1  2  0  0.59   25.1    0.24    0.61    0.17    0.57
   5  2  2  0  1.22   25.1    0.51    0.60    0.38    0.27
   5  3  2  0  1.81   25.0    0.81    1.28    0.64    5.60
   6  1  1  0  0.60   15.1    0.30    0.12    0.20    0.47
   6  2  1  0  1.22   15.2    0.64    0.48    0.45    0.53
   6  1  2  0  0.60   25.0    0.28    0.51    0.18    0.47
   6  2  2  0  1.22   25.1    0.57    0.51    0.41    1.64
   6  3  2  0  1.79   25.1    0.91    1.57    2.09    0.58
   6  1  3  0  0.60   35.1    0.23    0.20    0.20    0.10
   6  2  3  0  1.19   35.0    0.51    0.62    0.44    0.28
   6  3  3  0  1.79   35.0    0.98    3.32    6.58    0.59
"Dynatest FWD"
   1  2  0  426  107   92   74   61   47   39   24
   1  4  0  953  245  209  174  141  112   89   54
   2  2  0  424  112   92   74   55   43    0    0
   2  4  0  946  255  215  174  134  101    0    0
   3  2  0  420  141  117   88   66   48   36   20
   3  4  0  942  326  271  208  159  113   82   45
   4  2  0  421  114   92   74   59   46    0    0
   4  4  0  944  256  209  169  135  107    0    0
   5  2  0  422   87   69   55   42   34   27   16
   5  4  0  944  194  158  128  100   78   61   37
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  420  101   79   60   46   35    0    0
   6  3  0  650  157  127   97   76   56    0    0
   6  4  0  942  225  186  143  112   83    0    0



"F18"  52  "US"   31   9510  22.0   2092  "N"
"F. Miami/Fulton CL southerly"    9.97
"F. Miami/Fulton CL & CR400S (4.8m. s. of SR25) southerly (SB)"     0.25
1   9196  75  11  2.5   0.00  11.0   0.0   2.4  "G"
"A-4"     3  "CL-ML"  130.8  10.1  13  17.1  12.7   4.5  2.72
 44  3.0  0
2
"04-02-86"  1  1  1  1  1130  1200   67    0    0  56  58
"Dynaflect"
   1  0  1.0  8  0.49  0.42  0.31  0.25  0.17
   2  0  1.0  8  0.41  0.34  0.24  0.19  0.12
   3  0  1.0  8  0.48  0.42  0.30  0.25  0.17
   4  0  1.0  8  0.38  0.32  0.23  0.23  0.13
   5  0  1.0  8  0.49  0.42  0.30  0.25  0.16
   6  0  1.0  8  0.51  0.44  0.30  0.31  0.18
"Road Rater 400"
   1  1  2  0  0.61   25.1    0.38    0.32    0.27    0.29
   1  2  2  0  1.25   25.2    0.80    0.96    0.60    1.09
   1  3  2  0  1.86   25.2    1.29    1.23    1.01    2.03
   2  1  2  0  0.60   25.1    0.29    0.25    0.18    0.11
   2  2  2  0  1.23   25.2    0.60    0.42    1.00    0.38
   2  3  2  0  1.87   25.2    0.92    0.80    1.13    0.46
   3  1  2  0  0.60   25.1    0.35    0.23    0.24    0.20
   3  2  2  0  1.23   25.2    0.77    1.61    0.95    0.46
   3  3  2  0  1.87   25.2    1.26    1.18    1.01    0.87
   4  1  2  0  0.59   25.1    0.27    0.59    0.20    0.12
   4  2  2  0  1.26   25.2    0.58    1.39    0.42    0.31
   4  3  2  0  1.87   25.2    0.95    1.60    0.70    0.60
   5  1  2  0  0.60   25.1    0.36    0.32    0.15    0.18
   5  2  2  0  1.24   25.2    0.77    1.27    1.47    0.38
   5  3  2  0  1.86   25.2    1.26    0.88    1.76    0.72
   6  1  1  0  0.63   15.3    0.34    0.29    0.23    0.15
   6  2  1  0  1.28   15.4    0.72    0.70    0.51    0.35
   6  1  2  0  0.61   25.2    0.38    0.44    0.27    0.18
   6  2  2  0  1.26   25.3    0.82    2.02    0.61    0.45
   6  3  2  0  1.89   25.3    1.40    1.97    1.08    0.90
   6  1  3  0  0.59   35.2    0.31    0.05    0.80    0.17
   6  2  3  0  1.21   35.1    0.72    0.09    1.37    0.43
   6  3  3  0  1.81   35.2    1.59    3.09    1.42    1.03
"Road Rater 2000"
   1  1  2  0  0.62   25.0    0.43    0.38    0.27    0.23
   1  2  2  0  1.19   25.1    0.85    0.76    0.53    0.46
   1  3  2  0  1.82   25.0    1.29    1.16    0.82    0.71
```

```
    1   4   2   0   2.42    25.0     1.75     1.57     1.13     0.97
    1   5   2   0   3.59    25.0     2.73     2.45     1.86     1.54
    2   1   2   0   0.57    25.1     0.32     0.20     0.18     0.12
    2   2   2   0   1.18    25.0     0.65     0.42     0.34     0.25
    2   3   2   0   1.79    25.1     1.01     0.67     0.53     0.39
    2   4   2   0   2.41    25.0     1.40     0.91     0.72     0.53
    2   5   2   0   3.61    25.1     2.27     1.43     1.12     0.85
    3   1   2   0   0.61    25.1     0.29     0.33     0.26     0.21
    3   2   2   0   1.19    25.0     0.58     0.67     0.57     0.46
    3   3   2   0   1.81    25.0     0.90     1.03     0.86     0.70
    3   4   2   0   2.40    25.0     1.25     1.42     1.21     0.97
    3   5   2   0   3.60    25.0     2.03     2.20     1.85     1.52
    4   1   2   0   0.60    24.9     0.23     0.29     0.18     0.15
    4   2   2   0   1.19    24.9     0.49     0.60     0.38     0.31
    4   3   2   0   1.79    25.0     0.75     0.89     0.59     0.47
    4   4   2   0   2.43    25.0     1.17     1.19     0.79     0.66
    4   5   2   0   3.61    25.0     1.91     1.74     1.25     1.02
    5   1   2   0   0.59    25.0     0.44     0.31     0.27     0.19
    5   2   2   0   1.18    25.0     0.90     0.61     0.53     0.39
    5   3   2   0   1.80    25.0     1.39     0.97     0.84     0.61
    5   4   2   0   2.40    24.9     1.95     1.33     1.16     0.85
    5   5   2   0   3.60    25.0     3.10     2.10     1.78     1.34
    6   1   1   0   0.60    15.0     0.32     0.29     0.25     0.17
    6   2   1   0   1.23    15.0     0.68     0.61     0.54     0.37
    6   3   1   0   1.77    15.0     1.09     0.92     0.83     0.61
    6   4   1   0   2.38    15.0     1.50     1.28     1.13     0.83
    6   5   1   0   3.61    15.0     2.36     2.03     1.81     1.36
    6   1   2   0   0.60    25.1     0.37     0.32     0.26     0.20
    6   2   2   0   1.20    25.1     0.75     0.65     0.53     0.43
    6   3   2   0   1.80    25.1     1.13     1.00     0.82     0.66
    6   4   2   0   2.39    25.1     1.54     1.37     1.12     0.89
    6   5   2   0   3.60    25.1     2.38     2.11     1.72     1.39
    6   1   3   0   0.61    35.1     0.35     0.30     0.24     0.19
    6   2   3   0   1.21    35.1     0.67     0.58     0.47     0.38
    6   3   3   0   1.80    35.1     1.03     0.87     0.72     0.58
    6   4   3   0   2.42    35.1     1.38     1.18     0.97     0.78
    6   5   3   0   3.61    35.2     2.07     1.80     1.47     1.20
"Dynatest FWD"
    1   2   0   432   101    91    73    56    39     0     0
    1   4   0   927   234   201   162   125    89     0     0
    2   2   0   429   103    86    68    49    34     0     0
    2   4   0   909   233   189   150   107    77     0     0
    3   2   0   432    94    92    75    55    42     0     0
    3   4   0   912   228   200   162   123    91     0     0
    4   2   0   431    90    76    63    46    34     0     0
    4   4   0   903   213   171   138   105    77     0     0
    5   2   0   433   104    92    73    54    39    27    14
    5   4   0   907   243   202   160   120    85    61    29
    6   1   0   192    48    42    36    27    18     0     0
    6   2   0   427   115    98    81    60    45     0     0
    6   3   0   661   183   156   128    96    69     0     0
    6   4   0   906   255   217   177   133    97     0     0
"08-25-86"  1  1  0  1  1050  1115   88   84   82  75  70
"Dynaflect"
    1   0   1.0   8   0.45   0.38   0.29   0.20   0.12
    2   0   1.0   8   0.36   0.29   0.22   0.14   0.08
    3   0   1.0   8   0.43   0.36   0.27   0.18   0.11
    4   0   1.0   8   0.36   0.30   0.23   0.15   0.09
    5   0   1.0   8   0.46   0.37   0.29   0.19   0.11
    6   0   1.0   8   0.51   0.42   0.32   0.22   0.14
"Road Rater 400"
    1   1   2   0   0.60    25.2     0.38     0.32     0.26     0.17
    1   2   2   0   1.20    25.2     0.82     0.75     0.60     0.44
    1   3   2   0   1.78    25.1     1.34     1.24     1.02     0.76
    2   1   2   0   0.59    25.0     0.25     0.31     0.21     0.10
    2   2   2   0   1.20    25.1     0.59     0.80     0.37     0.25
    2   3   2   0   1.82    25.1     0.92     0.83     0.62     0.42
    3   1   2   0   0.61    25.1     0.34     0.31     0.29     0.17
    3   2   2   0   1.19    25.1     0.77     0.80     0.69     0.42
    3   3   2   0   1.82    25.1     1.24     1.40     0.94     0.71
```

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   4  1  2  0  0.61   25.0    0.27    0.35    0.27    0.11
   4  2  2  0  1.22   25.1    0.62    0.85    0.61    0.30
   4  3  2  0  1.78   25.1    0.96    1.17    0.75    0.51
   5  1  2  0  0.61   25.1    0.35    0.31    0.23    0.15
   5  2  2  0  1.21   25.1    0.80    0.72    0.52    0.39
   5  3  2  0  1.83   25.1    1.28    1.38    0.88    0.64
   6  1  1  0  0.60   15.0    0.33    0.29    0.21    1.01
   6  2  1  0  1.18   15.0    0.74    0.64    0.51    1.20
   6  1  2  0  0.59   25.0    0.39    0.35    0.26    0.18
   6  2  2  0  1.21   25.1    0.87    0.92    0.61    0.53
   6  3  2  0  1.81   25.1    1.44    1.28    1.04    1.68
   6  1  3  0  0.59   34.9    0.37    0.32    0.26    0.24
   6  2  3  0  1.22   35.1    0.95    0.84    0.68    0.63
   6  3  3  0  1.80   35.1    1.68    1.52    1.27    1.41
"Dynatest FWD"
   1  2  0  394  123   97   72   50   35   21   11
   1  4  0  900  890  236  178  125   86   57   26
   2  2  0  391  107   78   54   36   23    0    0
   2  4  0  896  257  195  137   92   62    0    0
   3  2  0  391  122   93   67   48   31   22   11
   3  4  0  892  287  223  165  116   78   54   27
   4  2  0  391  101   75   56   39   25    0    0
   4  4  0  894  241  181  137   96   64    0    0
   5  2  0  390  129   97   68   46   29   20   08
   5  4  0  890  307  231  168  112   73   51   27
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  386  139  104   79   52   36    0    0
   6  3  0  604  221  170  126   87   60    0    0
   6  4  0  883  325  250  187  131   90    0    0



"F19"  90  "SR"    1   2560  27.5    704  "N"
"F. 3.15m. n. of Jay/Wells CL northerly to Bluffton C/L"     7.72
"F. CR500S (1.0m. n. of SR218) southerly (SB)"    0.25
1   9196  75   8  1.6   0.00   7.4   0.0   6.0  "6"
"A-7-6"  18  "CH"       93.7  29.6   5  53.2  26.0  27.2  2.65
  0  5.0  0
2
"04-08-86"  1  1  1  1  1215  1245   82    0    0  55  55
"Dynaflect"
   1  0  1.0  3  1.07  0.81  0.45  0.39  0.25
   2  0  1.0  8  1.27  0.93  0.81  0.45  0.30
   3  0  1.0  8  1.11  0.80  0.65  0.36  0.24
   4  0  1.0  8  1.02  0.75  0.64  0.32  0.20
   5  0  1.0  8  1.04  0.78  0.53  0.31  0.19
   6  0  1.0  8  0.94  0.71  0.58  0.31  0.19
"Road Rater 400"
   1  1  2  0  0.61   25.1    1.06    1.19    0.68    0.50
   1  2  2  0  1.22   25.1    2.28    1.94    1.45    1.09
   1  3  2  0  1.81   25.1    4.14    3.39    2.55    1.89
   2  1  2  0  0.61   25.3    1.07    0.79    0.64    0.48
   2  2  2  0  1.21   25.0    2.47    1.60    1.40    1.10
   2  3  2  0  1.82   25.0    4.71    3.84    2.52    1.88
   3  1  2  0  0.59   25.0    0.99    1.01    0.57    0.40
   3  2  2  0  1.20   25.0    2.21    1.79    1.27    0.90
   3  3  2  0  1.80   25.0    4.06    2.68    2.31    1.62
   4  1  2  0  0.58   25.0    0.91    0.61    1.04    0.33
   4  2  2  0  1.20   25.0    2.06    2.03    1.03    0.71
   4  3  2  0  1.83   25.1    3.90    3.03    2.01    1.30
   5  1  2  0  0.59   24.9    0.95    0.65    1.11    0.31
   5  2  2  0  1.21   25.0    2.16    2.15    1.04    0.63
   5  3  2  0  1.82   25.0    4.18    4.16    2.56    1.16
   6  1  1  0  0.54   14.1    0.61    0.42    0.28    0.19
   6  2  1  0  1.19   15.1    1.52    1.07    0.59    0.49
   6  1  2  0  0.60   25.0    0.87    0.65    0.28    0.30
   6  2  2  0  1.20   25.0    1.93    1.44    1.25    0.67
   6  3  2  0  1.81   25.0    3.78    2.65    1.08    1.19
   6  1  3  0  0.60   35.0    0.76    0.61    0.40    0.32
   6  2  3  0  1.19   35.0    1.80    1.53    0.97    0.90
   6  3  3  0  1.81   35.0    3.43    2.94    1.95    1.89
"Road Rater 2000"
   1  1  2  0  0.61   25.1    1.01    0.72    0.57    0.46
   1  2  2  0  1.19   25.1    2.28    1.68    1.24    0.97
   1  3  2  0  1.81   25.1    3.78    2.77    1.99    1.52
   1  4  2  0  2.43   25.1    5.34    3.93    2.81    2.11
   1  5  2  0  3.59   25.1    9.31    6.83    4.72    3.38
   2  1  2  0  0.60   25.1    0.99    0.75    0.52    0.43
   2  2  2  0  1.17   25.1    2.25    1.68    1.14    0.95
   2  3  2  0  1.80   25.1    3.76    2.77    1.91    1.52
   2  4  2  0  2.39   25.1    5.52    4.00    2.71    2.08
   2  5  2  0  3.59   25.1    9.87    7.23    4.70    3.46
   3  1  2  0  0.59   25.1    1.01    0.71    0.58    0.44
   3  2  2  0  1.15   25.1    2.28    1.58    1.25    0.95
   3  3  2  0  1.81   25.1    3.99    2.77    2.14    1.56
   3  4  2  0  2.42   25.1    5.71    3.97    2.98    2.18
   3  5  2  0  3.63   25.1    9.72    7.11    5.22    3.69
   4  1  2  0  0.60   25.2    0.80    0.58    0.38    0.30
   4  2  2  0  1.15   25.1    1.83    1.32    0.88    0.64
   4  3  2  0  1.80   25.1    3.16    2.29    1.46    1.05
   4  4  2  0  2.38   25.1    4.52    3.28    2.11    1.47
   4  5  2  0  3.61   25.1    8.69    6.00    3.80    2.47
   5  1  2  0  0.56   25.1    0.78    0.55    0.45    0.28
   5  2  2  0  1.19   25.1    1.84    1.30    0.91    0.61
   5  3  2  0  1.81   25.1    3.16    2.16    1.39    0.95
   5  4  2  0  2.42   25.1    4.65    3.16    2.01    1.33
   5  5  2  0  3.61   25.1    8.24    5.72    3.41    2.20
   6  1  1  0  0.61   14.9    0.82    0.50    0.39    0.25
   6  2  1  0  1.20   14.9    1.79    1.10    0.80    0.53
   6  3  1  0  1.77   15.0    2.99    1.78    1.31    0.84
   6  4  1  0  2.37   14.8    4.43    2.73    1.90    1.20
   6  5  1  0  3.51   15.0    7.37    5.49    3.19    2.10
   6  1  2  0  0.58   25.1    0.77    0.60    0.43    0.35
   6  2  2  0  1.18   25.1    1.76    1.34    0.90    0.62
   6  3  2  0  1.83   25.1    3.03    2.24    1.48    0.97
   6  4  2  0  2.40   25.1    4.39    3.23    2.09    1.36
   6  5  2  0  3.60   25.1    7.77    5.72    3.67    2.37
   6  1  3  0  0.62   35.1    0.71    0.53    0.40    0.27
   6  2  3  0  1.23   35.2    1.74    1.35    0.95    0.62
   6  3  3  0  1.78   35.2    2.78    2.01    1.46    0.97
   6  4  3  0  2.42   35.2    4.15    3.17    2.13    1.42
   6  5  3  0  3.62   35.1    7.07    5.41    3.54    2.34
"Dynatest FWD"
   1  2  0  410  399  295  164  103   66    0    0
   1  4  0  917  824  593  362  215  135    0    0
   2  2  0  407  480  333  195  116   78    0    0
   2  4  0  901  980  678  418  254  166    0    0
   3  2  0  399  428  301  170   97   60    0    0
   3  4  0  888  887  617  364  214  134    0    0
   4  2  0  415  389  284  163   90   54    0    0
   4  4  0  896  816  587  350  198  120    0    0
   5  2  0  404  432  302  153   84   49   35   21
   5  4  0  910  887  608  336  182  111   78   51
   6  1  0  208  159  122   66   39   27    0    0
   6  2  0  405  367  247  145   82   51    0    0
   6  3  0  651  562  390  226  132   81    0    0
   6  4  0  917  766  534  320  187  114    0    0
"08-28-86"  1  1  0  1  1230  1300   84   96   90  65  69
"Dynaflect"
   1  0  1.0  8  0.74  0.62  0.46  0.34  0.23
   2  0  1.0  8  0.85  0.67  0.49  0.37  0.25
   3  0  1.0  8  0.81  0.64  0.45  0.32  0.21
   4  0  1.0  8  0.71  0.54  0.37  0.26  0.16
   5  0  1.0  8  0.71  0.56  0.37  0.26  0.15
   6  0  1.0  8  0.68  0.54  0.36  0.26  0.17
"Road Rater 400"
   1  1  2  0  0.58   25.0    0.74    0.39    0.49    0.38
   1  2  2  0  1.21   25.0    1.77    1.26    1.15    1.78
   1  3  2  0  1.80   25.0    3.16    2.34    2.01    1.59
```

```
     2  1  2  0  0.58   25.0    0.82    0.66    0.52    0.40
     2  2  2  0  1.20   25.0    1.93    1.61    1.24    0.98
     2  3  2  0  1.81   25.0    3.60    2.96    2.18    1.67
     3  1  2  0  0.60   25.0    0.87    0.73    0.53    0.38
     3  2  2  0  1.19   25.0    1.92    1.65    1.19    0.88
     3  3  2  0  1.81   25.0    3.68    3.31    2.16    1.57
     4  1  2  0  0.58   25.0    0.70    0.63    0.38    0.26
     4  2  2  0  1.21   25.0    1.55    1.32    0.89    0.61
     4  3  2  0  1.80   25.0    2.99    2.03    1.61    1.07
     5  1  2  0  0.59   25.0    0.73    0.61    0.38    0.25
     5  2  2  0  1.20   25.0    1.60    1.26    0.80    0.54
     5  3  2  0  1.79   25.0    3.05    2.27    1.46    0.97
     6  1  1  0  0.61   15.1    0.53    0.42    0.31    0.20
     6  2  1  0  1.20   15.1    1.23    0.99    0.71    0.49
     6  1  2  0  0.59   25.0    0.66    0.52    0.36    0.25
     6  2  2  0  1.21   25.1    1.52    1.21    0.85    0.61
     6  3  2  0  1.80   25.1    2.88    2.34    1.54    1.11
     6  1  3  0  0.59   34.9    0.61    0.49    0.47    0.26
     6  2  3  0  1.20   35.0    1.53    1.28    0.99    0.68
     6  3  3  0  1.80   35.0    3.80    3.05    4.95    1.49
"Dynatest FWD"
    1  2  0  393  315  216  137   89   62   43   25
    1  4  0  907  726  519  327  205  137  100   57
    2  2  0  382  376  245  155  100   67    0    0
    2  4  0  895  805  561  362  235  157    0    0
    3  2  0  384  366  242  142   92   58   41   23
    3  4  0  908  806  549  339  213  136   90   52
    4  2  0  382  347  229  132   75   48    0    0
    4  4  0  889  768  536  312  183  112    0    0
    5  2  0  378  338  218  121   70   45   31   26
    5  4  0  890  754  505  293  170  106   76   47
    6  1  0    0    0    0    0    0    0    0    0
    6  2  0  385  306  201  115   70   45    0    0
    6  3  0  612  472  324  189  115   77    0    0
    6  4  0  898  678  472  282  173  108    0    0



"L10"  64  "SR"    8   2490  16.0    398  "N"
"F. Crooked Creek bridge easterly to Porter/LaPorte CL"    2.80
"F. 500' e. of CR500E easterly (WB)"    0.25
1   9316  73  13  1.3   0.00   4.6   0.0   7.2  "S"
"A-4"     1  "SC"     109.2  18.2  14  29.0  19.6   9.4  2.60
 34  2.2  0
2
"04-14-86"  1  1  1  1  1120  1150   57    0    0  48  44
"Dynaflect"
   1  0  1.0  8  1.57  1.15  1.09  0.61  0.44
   2  0  1.0  8  1.46  1.12  1.10  0.61  0.44
   3  0  1.0  8  1.36  1.02  0.98  0.53  0.45
   4  0  1.0  8  1.46  1.11  0.75  0.53  0.40
   5  0  1.0  8  1.70  1.22  0.83  0.55  0.40
   6  0  1.0  8  1.49  1.14  0.83  0.60  0.45
"Road Rater 400"
   1  1  2  0  0.65   25.4    1.18    0.81    0.60    0.60
   1  2  2  0  1.26   25.5    2.42    1.83    1.06    1.67
   1  3  2  0  1.89   25.5    5.03    3.73    2.11    2.75
   2  1  2  0  0.64   25.5    1.14    0.76    0.52    0.30
   2  2  2  0  1.26   25.5    2.52    2.12    1.15    0.74
   2  3  2  0  1.89   25.5    4.89    3.20    2.18    1.40
   3  1  2  0  0.60   25.6    1.06    0.70    0.69    0.34
   3  2  2  0  1.23   25.1    2.28    1.37    1.24    0.88
   3  3  2  0  1.89   25.5    4.09    3.06    1.81    0.61
   4  1  2  0  0.61   25.4    1.38    0.86    0.45    0.24
   4  2  2  0  1.22   25.2    2.85    1.78    1.00    0.63
   4  3  2  0  1.85   25.2    5.15    3.53    1.81    1.07
   5  1  2  0  0.58   25.2    1.25    0.94    0.56    0.28
   5  2  2  0  1.27   25.2    2.96    2.60    0.86    0.62
   5  3  2  0  1.83   25.2    5.46    4.24    1.62    1.18
   6  1  1  0  0.60   15.0    1.13    0.83    0.62    0.35
   6  2  1  0  1.26   15.1    2.65    1.88    1.34    0.76
   6  1  2  0  0.62   25.4    1.11    0.73    0.36    0.26
   6  2  2  0  1.27   25.0    2.50    1.68    0.99    0.45
   6  3  2  0  1.81   25.0    4.21    3.40    1.81    1.13
   6  1  3  0  0.59   35.0    0.87    0.57    0.34    0.17
   6  2  3  0  1.21   35.3    2.18    1.50    0.90    0.54
   6  3  3  0  1.80   35.4    4.50    3.05    1.82    1.08
"Road Rater 2000"
   1  1  2  0  0.61   24.9    0.69    0.44    0.31    0.15
   1  2  2  0  1.20   24.9    2.02    1.26    0.79    0.37
   1  3  2  0  1.82   24.9    3.50    2.15    1.30    0.60
   1  4  2  0  2.36   24.9    5.26    3.14    1.87    1.09
   1  5  2  0  3.60   24.9   10.38    6.14    3.49    2.05
   2  1  2  0  0.61   24.9    0.85    0.62    0.45    0.32
   2  2  2  0  1.17   24.9    1.94    1.42    0.97    0.66
   2  3  2  0  1.89   25.0    3.53    2.50    1.64    1.09
   2  4  2  0  2.41   24.9    5.19    3.70    2.37    1.58
   2  5  2  0  3.60   24.9    9.54    6.73    4.09    2.58
   3  1  2  0  0.62   25.0    0.86    0.59    0.41    0.31
   3  2  2  0  1.20   24.9    2.00    1.35    0.89    0.65
   3  3  2  0  1.83   24.9    3.47    2.29    1.47    1.04
   3  4  2  0  2.40   24.9    5.07    3.32    2.08    1.44
   3  5  2  0  3.62   25.0    9.58    6.09    3.45    2.36
   4  1  2  0  0.65   24.9    0.93    0.60    0.39    0.26
   4  2  2  0  1.17   24.9    1.93    1.28    0.78    0.52
   4  3  2  0  1.80   24.9    3.45    2.28    1.33    0.86
   4  4  2  0  2.45   24.9    5.25    3.42    1.92    1.21
   4  5  2  0  3.61   24.9    9.69    6.22    3.33    2.00
   5  1  2  0  0.59   25.0    0.92    0.62    0.38    0.26
   5  2  2  0  1.21   24.8    2.35    1.57    0.95    0.60
   5  3  2  0  1.79   24.9    3.96    2.59    1.52    0.94
   5  4  2  0  2.40   24.9    5.87    3.86    2.22    1.35
   5  5  2  0  3.65   25.0   11.04    7.29    3.98    2.30
   6  1  1  0  0.65   15.0    0.91    0.69    0.56    0.34
   6  2  1  0  1.24   15.0    2.13    1.60    1.26    0.77
   6  3  1  0  1.83   15.0    3.76    2.75    2.13    1.29
   6  4  1  0  2.36   15.1    5.29    3.94    2.98    1.83
   6  5  1  0  3.55   15.0    9.33    6.62    4.58    3.05
   6  1  2  0  0.59   25.1    0.76    0.52    0.34    0.24
   6  2  2  0  1.17   25.0    1.87    1.33    0.87    0.55
   6  3  2  0  1.78   25.1    3.16    2.20    1.43    0.91
   6  4  2  0  2.46   25.1    4.70    3.28    2.11    1.33
   6  5  2  0  3.64   25.1    7.77    5.35    3.43    2.09
   6  1  3  0  0.56   35.2    0.66    0.46    0.31    0.23
   6  2  3  0  1.17   35.2    1.66    1.16    0.78    0.52
   6  3  3  0  1.78   35.1    2.78    1.89    1.24    0.83
   6  4  3  0  2.35   35.2    4.19    2.84    1.84    1.22
   6  5  3  0  3.55   35.2    7.14    4.67    3.03    1.88
"Dynatest FWD"
   1  2  0  407  578  395  202  111   73    0    0
   1  4  0  894 1195  853  449  239  156    0    0
   2  2  0  402  545  375  208  123   78    0    0
   2  4  0  891 1120  805  470  271  167    0    0
   3  2  0  400  572  356  176  110   76    0    0
   3  4  0  880 1115  709  388  227  157    0    0
   4  2  0  415  602  424  199  114   68    0    0
   4  4  0  875 1215  851  422  234  144    0    0
   5  2  0  406  628  416  212  112   73   55   38
   5  4  0  899 1293  867  470  248  156  117   81
   6  1  0  197  192  138   82   54   33    0    0
   6  2  0  408  454  325  192  117   78    0    0
   6  3  0  658  730  512  315  191  125    0    0
   6  4  0  904 1  0  714  435  264  171    0    0
"09-04-86"  1  1  0  1  0815  0847   79   82   79  72  65
"Dynaflect"
   1  0  1.0  8  0.94  0.73  0.50  0.34  0.25
   2  0  1.0  8  1.15  0.84  0.57  0.39  0.28
   3  0  1.0  8  0.98  0.71  0.52  0.36  0.26
   4  0  1.0  8  1.14  0.81  0.52  0.36  0.26
   5  0  1.0  8  1.32  0.90  0.55  0.36  0.26
   6  0  1.0  8  1.16  0.89  0.60  0.42  0.31
"Road Rater 400"
   1  1  2  0    0.52   25.4    0.98    0.72    0.47    0.32
   1  2  2  0    1.31   25.4    2.60    2.16    2.07    0.90
   1  3  2  0    1.82   25.5    8.67    5.48    6.68    2.25
   2  1  2  0    0.62   25.4    1.29    1.15    0.67    0.48
   2  2  2  0    1.25   25.0    4.93    3.37    2.28    1.64
   2  3  2  0    1.71   25.0    8.95    7.01    4.04    2.66
   3  1  2  0    0.61   25.0    0.91    0.69    0.46    2.88
   3  2  2  0    1.23   25.0    2.72    2.10    1.34    0.93
   3  3  2  0    1.86   25.1    5.12    5.09    2.69    1.79
   4  1  2  0    0.57   25.0    1.02    0.90    0.45    0.30
   4  2  2  0    1.29   25.0    4.28    3.13    1.88    1.17
   4  3  2  0    1.77   25.1    8.46    6.78    4.01    2.27
   5  1  2  0    0.59   25.0    1.54    1.15    0.65    0.39
   5  2  2  0    1.18   25.0    4.32    3.19    1.73    1.09
   5  3  2  0    1.86   25.1    8.53    6.22    3.22    1.93
   6  1  1  0    0.60   15.1    0.89    0.69    0.44    0.28
   6  2  1  0    1.27   15.1    2.44    1.94    1.16    0.81
   6  1  2  0    0.60   25.1    1.03    0.62    0.31    0.30
   6  2  2  0    1.32   25.1    3.42    2.49    1.32    2.65
   6  3  2  0    1.73   25.1    6.77    6.56    5.01    2.01
   6  1  3  0    0.62   35.2    5.70    2.77    2.20    1.40
"Dynatest FWD"
   1  2  0  392  515  316  163   99   62   40   31
   1  4  0  893 1127  737  396  223  139  102   63
   2  2  0  392  554  346  180  101   65    0    0
   2  4  0  891 1125  810  428  245  146    0    0
   3  2  0  391  487  279  145   88   59   45   27
   3  4  0  892 1005  617  335  195  133  103   62
   4  2  0  388  521  313  154   84   56    0    0
   4  4  0  887 1085  705  355  192  126    0    0
   5  2  0  386  669  386  175   97   59   48   30
   5  4  0  879 1390  859  415  219  130  105   64
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  383  435  296  166   95   62    0    0
   6  3  0  606  700  485  273  157  104    0    0
   6  4  0  886 1025  715  413  238  153    0    0



"L11"  64  "SR"    8   2770  16.0    443  "N"
"F. 1.0m. e. of Kouts C/L easterly to Crooked Creek bridge"     0.74
"F. 1.0  8' w/ of Crooked Creek bridge westerly (WB)"    0.25
1   9316  73  13  1.5   0.00   6.4   0.0   5.2  "G"
"A-2-4"   0  "SC"     122.5  36.5   3  22.7  14.6   8.1  2.22
  0  2.4  0
2
"04-14-86"  1  1  1  1  1200  1230   51    0    0  48  44
"Dynaflect"
   1  0  1.0  8  0000  0000  0000  0000  0000
   2  0  1.0  8  3.80  3.33  2.91  2.43  1.99
   3  0  1.0  8  3.30  2.87  2.39  1.92  1.53
   4  0  1.0  8  2.50  2.15  1.80  1.40  1.09
   5  0  1.0  8  3.46  3.13  2.38  1.77  1.28
   6  0  1.0  8  3.20  2.64  2.14  1.63  1.22
   7  0  1.0  8  1.51  1.22  0.93  0.68  0.48
"Road Rater 400"
   1  0  0  0      0       0       0       0       0       0
   1  0  0  0      0       0       0       0       0       0
   1  0  0  0      0       0       0       0       0       0
   2  1  2  0  0.62    25.4    0.98    1.14    0.51    0.37
   2  2  2  0  1.27    25.5    2.33    2.32    1.25    0.86
   2  3  2  0  1.81    25.0    4.41    3.16    2.16    1.39
   3  1  2  0  0.59    25.0    1.16    1.47    0.74    0.51
   3  2  2  0  1.22    25.0    2.69    3.03    1.61    1.19
   3  3  2  0  1.83    25.1    5.14    5.94    2.90    2.10
   4  1  2  0  0.60    25.0    0.93    1.43    0.18    0.41
```

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    4  2  2  0  1.25   25.1    2.25    3.03    0.78    1.00
    4  3  2  0  1.84   25.1    4.13    4.41    1.78    1.83
    5  1  2  0  0.62   25.0    1.68    1.33    1.06    0.70
    5  2  2  0  1.24   25.3    3.93    3.47    1.91    1.62
    5  3  2  0  1.88   25.4    7.20    6.55    3.01    2.79
    6  1  1  0  0.62   15.2    2.95    2.57    2.39    1.67
    6  2  1  0  1.29   15.6    6.96    6.11    5.67    3.75
    6  1  2  0  0.61   25.4    1.55    1.64    0.52    0.78
    6  2  2  0  1.26   25.4    3.63    3.49    1.63    1.86
    6  3  2  0  1.38   25.5    7.01    6.89    3.07    3.19
    6  1  3  0  0.60   35.4    0.99    0.79    0.59    0.38
    6  2  3  0  1.21   35.7    2.55    2.07    1.47    0.94
    6  3  3  0  1.83   35.4    5.88    4.63    3.26    2.09
"Road Rater 2000"
    1  0  0  0     0      0       0       0       0       0
    1  0  0  0     0      0       0       0       0       0
    1  0  0  0     0      0       0       0       0       0
    1  0  0  0     0      0       0       0       0       0
    1  0  0  0     0      0       0       0       0       0
    2  1  2  0  0.60   24.9    0.06    0.11    0.07    0.08
    2  2  2  0  1.24   24.9    1.76    1.28    0.96    0.66
    2  3  2  0  1.91   24.9    3.06    2.23    1.62    1.09
    2  4  2  0  2.28   24.9    4.30    3.16    2.28    1.56
    2  5  2  0  3.46   24.9    7.17    5.18    3.62    2.39
    3  1  2  0  0.71   25.0    0.13    0.15    0.13    0.12
    3  2  2  0  1.17   24.9    1.37    1.11    0.85    0.60
    3  3  2  0  1.88   24.9    2.82    2.26    1.68    1.21
    3  4  2  0  2.40   24.9    4.23    3.39    2.52    1.82
    3  5  2  0  3.66   24.9    6.67    5.26    3.88    2.76
    4  1  2  0  0.63   25.0    0.16    0.14    0.14    0.11
    4  2  2  0  1.20   24.9    1.10    0.91    0.75    0.58
    4  3  2  0  1.73   25.0    2.46    2.03    1.60    1.20
    4  4  2  0  2.38   24.9    3.33    2.75    2.16    1.59
    4  5  2  0  3.71   24.9    7.52    6.05    4.58    3.22
    5  1  2  0  0.63   24.9    0.41    0.34    0.28    0.23
    5  2  2  0  1.16   25.0    2.15    1.77    1.42    1.12
    5  3  2  0  1.77   24.9    5.02    4.01    3.17    2.38
    5  4  2  0  2.34   25.0    7.35    5.98    4.62    3.37
    5  5  2  0  3.57   25.0   13.69   10.58    7.79    5.48
    6  1  1  0  0.65   15.0    0.57    0.49    0.43    0.34
    6  2  1  0  1.22   15.0    4.50    3.72    3.33    2.38
    6  3  1  0  1.95   15.0    6.44    5.45    4.80    3.44
    6  4  1  0  2.23   15.0   12.36   10.43    9.04    6.17
    6  5  1  0  3.49   14.9    0.00   18.20   16.04   11.38
    6  1  2  0  0.55   24.9    0.23    0.20    0.19    0.16
    6  2  2  0  1.33   24.8    2.67    2.19    1.86    1.40
    6  3  2  0  1.79   24.9    4.96    4.04    3.38    2.44
    6  4  2  0  2.48   24.9    7.30    5.81    4.76    3.29
    6  5  2  0  3.64   24.9   13.38   10.23    8.14    5.40
    6  1  3  0  0.66   35.2    0.73    0.56    0.49    0.38
    6  2  3  0  1.11   35.1    1.72    1.31    1.11    0.83
    6  3  3  0  1.87   35.1    3.57    2.66    2.17    1.55
    6  4  3  0  2.41   35.2    5.43    3.92    3.13    2.16
    6  5  3  0  3.61   35.1   10.04    6.54    5.11    3.37
"Dynatest FWD"
    1  2  0    0    0    0    0    0    0    0    0
    1  4  0    0    0    0    0    0    0    0    0
    2  2  0  410  643  529  346  263  184    0    0
    2  4  0  895 1320 1050  732  533  375    0    0
    3  2  0  407  685  573  393  290  196    0    0
    3  4  0  901 1415 1180  858  612  427    0    0
    4  2  0  409  549  457  347  243  172    0    0
    4  4  0  907 1165  974  731  519  361    0    0
    5  2  0  399  877  742  456  323  207  134   78
    5  4  0  888 1740 1420  950  652  438  280  163
    6  1  0  205  385  348  190  148   89    0    0
    6  2  0  403  836  690  452  309  206    0    0
    6  3  0  640 1290 1060  720  492  330    0    0
    6  4  0  882 1710 1390  975  661  446    0    0
"09-04-86"  1  1  0  1  0900  0930   85   84   87  77  65
```

```
"Dynaflect"
   1  0  1.0  8  2.54  2.42  2.27  2.06  1.87
   2  0  1.0  8  3.28  2.96  2.46  1.98  1.52
   3  0  1.0  8  2.81  2.50  2.08  1.61  1.21
   4  0  1.0  8  2.20  1.93  1.56  1.21  0.91
   5  0  1.0  8  3.16  2.61  2.04  1.51  1.07
   6  0  1.0  8  2.84  2.37  1.86  1.38  1.01
   7  0  1.0  8  1.46  1.09  0.75  0.50  0.33
"Road Rater 400"
   1  1  2  0   0.62   25.1    0.48    0.42    0.31    0.22
   1  2  2  0   1.23   25.1    1.11    1.01    0.76    0.60
   1  3  2  0   1.85   25.1    1.92    1.75    1.25    0.90
   2  1  2  0   0.60   25.1    1.01    0.86    1.15    0.45
   2  2  2  0   1.20   25.1    2.52    2.18    1.53    1.07
   2  3  2  0   1.85   25.2    4.48    3.85    2.35    1.81
   3  1  2  0   0.60   25.1    1.09    0.79    1.79    1.76
   3  2  2  0   1.25   25.1    3.12    2.73    2.04    2.13
   3  3  2  0   1.90   25.1    7.90    5.30    6.53    3.66
   4  1  2  0   0.62   25.1    1.05    0.95    0.82    0.59
   4  2  2  0   1.22   25.1    3.62    4.25    2.40    2.81
   4  3  2  0   1.80   25.2    5.23    4.83    3.55    2.39
   5  1  2  0   0.61   25.1    1.89    1.03    1.26    0.98
   5  2  2  0   1.23   25.1    4.61    3.76    2.90    2.26
   5  3  2  0   1.82   25.1    7.59    6.75    4.72    3.55
   6  1  1  0   0.63   15.2    2.85    2.50    2.07    1.65
   6  2  1  0   1.25   15.2    6.82    5.92    4.75    3.83
   6  1  2  0   0.61   25.0    1.74    1.49    1.24    1.01
   6  2  2  0   1.24   25.1    4.39    3.76    3.03    2.45
   6  3  2  0   1.81   25.1    7.27    6.25    4.84    3.74
   6  1  3  0   0.59   35.1    1.09    0.89    0.69    0.53
   6  2  3  0   1.18   35.1    3.88    3.06    2.25    1.70
   6  3  3  0   1.68   35.1    6.67    5.78    3.88    2.83
"Dynatest FWD"
   1  2  0  387   278   230   166   127   101    78    58
   1  4  0  887   622   514   386   288   222   178   123
   1  2  0  375   708   519   397   262   195     0     0
   1  4  0  860  1530  1230   851   591   409     0     0
   1  2  0  374   742   612   402   285   191   124    68
   1  4  0  859  1643  1370   944   651   441   299   168
   1  2  0  380   643   481   364   245   176     0     0
   1  4  0  864  1395  1140   798   561   372     0     0
   1  2  0  368   952   659   452   305   202   132    61
   1  4  0  846  1997  1510  1050   699   453   290   135
   1  1  0    0     0     0     0     0     0     0     0
   1  2  0  362   954   673   457   302   199     0     0
   1  3  0  574  1430  1080   725   489   338     0     0
   1  4  0  834  1995  1510  1060   695   463     0     0


"L12"  46  "US"  421  10060  19.5   1962  "N"
"F. US6S northerly to US6N"    0.99
"F. concrete plant entrance n. of SR6S northerly (NB)"    0.25
1  14056  84   2  2.2   0.00   7.0   0.0  13.8  "G"
"A-2-4"   0  "SC"       0.0  12.2  20  21.7  14.9   6.9  2.69
 89  3.3  0
2
"04-16-86"  1  1  1  1  0930  1000   43    0    0  38  46
"Dynaflect"
   1  0  1.0  8  0.47  0.40  0.35  0.28  0.23
   2  0  1.0  8  0.60  0.51  0.45  0.35  0.28
   3  0  1.0  8  0.50  0.42  0.37  0.30  0.22
   4  0  1.0  8  0.73  0.59  0.48  0.36  0.27
   5  0  1.0  8  0.58  0.49  0.42  0.33  0.27
   6  0  1.0  8  0.53  0.45  0.38  0.30  0.24
"Road Rater 400"
   1  1  2  0  0.60   24.8    0.52    0.37    0.21    1.74
   1  2  2  0  1.20   24.8    0.74    1.41    0.49    2.22
   1  3  2  0  1.77   24.8    1.11    1.29    0.76    0.77
```

```
    2  1  2  0  0.58   24.9    0.30    0.24    0.17    0.10
    2  2  2  0  1.20   24.9    0.70    0.56    0.43    0.33
    2  3  2  0  1.80   24.8    1.12    1.19    0.84    0.54
    3  1  2  0  0.59   25.0    0.28    0.10    1.67    0.44
    3  1  2  0  0.59   25.0    0.28    0.13    0.33    0.08
    3  2  2  0  1.23   25.1    0.63    1.10    0.44    0.26
    4  1  2  0  0.61   25.1    0.53    0.51    0.50    0.59
    4  2  2  0  1.22   25.0    1.08    0.88    0.69    1.30
    4  3  2  0  1.81   25.1    1.73    1.46    1.08    1.81
    5  1  2  0  0.60   25.0    0.36    0.28    0.59    0.86
    5  2  2  0  1.24   25.3    0.79    0.63    0.88    1.72
    5  3  2  0  1.84   25.1    1.30    1.35    1.16    0.59
    6  1  1  0  0.62   15.2    0.38    0.27    0.31    0.10
    6  2  1  0  1.24   15.2    0.83    0.68    0.31    0.28
    6  1  2  0  0.62   25.5    0.38    0.22    1.39    0.43
    6  2  2  0  1.27   25.5    0.85    0.91    1.23    0.79
    6  3  2  0  1.88   25.4    1.39    1.78    1.56    1.72
    6  1  3  0  0.58   35.1    0.28    0.17    0.10    0.08
    6  2  3  0  1.21   35.2    0.70    0.43    0.26    0.25
    6  3  3  0  1.75   35.0    1.20    1.03    0.74    0.46
"Road Rater 2000"
    1  1  2  0  0.60   25.0    0.23    0.18    0.16    0.13
    1  2  2  0  1.20   24.9    0.66    0.50    0.37    0.30
    1  3  2  0  1.86   24.9    1.12    0.85    0.60    0.52
    1  4  2  0  2.39   25.0    1.55    1.19    0.86    0.72
    1  5  2  0  3.63   25.0    2.46    1.95    1.42    1.17
    2  1  2  0  0.64   24.9    0.28    0.19    0.17    0.13
    2  2  2  0  1.18   25.0    0.65    0.49    0.40    0.31
    2  3  2  0  1.82   24.9    1.06    0.79    0.65    0.50
    2  4  2  0  2.44   24.9    1.51    1.12    0.92    0.70
    2  5  2  0  3.56   25.0    2.46    1.79    1.47    1.10
    3  1  2  0  0.59   25.0    0.02    0.02    0.01    0.02
    3  2  2  0  1.22   25.0    0.52    0.43    0.32    0.24
    3  3  2  0  1.84   24.9    0.87    0.70    0.52    0.40
    3  4  2  0  2.42   25.0    1.28    1.01    0.76    0.58
    3  5  2  0  3.63   24.9    2.09    1.70    1.28    0.97
    4  1  2  0  0.62   25.0    0.46    0.27    0.20    0.15
    4  2  2  0  1.26   25.0    1.27    0.76    0.56    0.41
    4  3  2  0  1.82   24.9    1.94    1.21    0.87    0.65
    4  4  2  0  2.40   24.9    2.75    1.73    1.23    0.89
    4  5  2  0  3.57   25.0    4.77    2.92    2.01    1.44
    5  1  2  0  0.65   24.9    0.14    0.15    0.12    0.10
    5  2  2  0  1.25   24.9    0.56    0.52    0.41    0.31
    5  3  2  0  1.79   25.0    0.97    0.85    0.68    0.50
    5  4  2  0  2.42   25.0    1.37    1.18    0.95    0.68
    5  5  2  0  3.64   24.9    2.13    1.80    1.47    1.02
    6  1  1  0  0.60   15.0    0.47    0.32    0.24    0.19
    6  2  1  0  1.22   14.9    1.06    0.70    0.51    0.42
    6  3  1  0  1.81   15.0    1.59    1.14    0.82    0.64
    6  4  1  0  2.36   15.0    2.38    1.63    1.16    0.95
    6  5  1  0  3.58   15.0    4.47    2.49    1.90    1.56
    6  1  2  0  0.60   25.0    0.33    0.21    0.17    0.15
    6  2  2  0  1.25   25.0    0.80    0.51    0.40    0.30
    6  3  2  0  1.77   25.1    1.23    0.79    0.61    0.46
    6  4  2  0  2.43   25.0    1.78    1.14    0.88    0.65
    6  5  2  0  3.59   25.1    3.11    1.89    1.44    1.07
    6  1  3  0  0.62   34.9    0.30    0.19    0.14    0.12
    6  2  3  0  1.20   34.9    0.70    0.44    0.34    0.24
    6  3  3  0  1.79   34.9    1.14    0.72    0.53    0.40
    6  4  3  0  2.38   34.9    1.59    1.00    0.74    0.55
    6  5  3  0  3.64   35.0    2.79    1.69    1.24    0.90
"Dynatest FWD"
    1  2  0  468  148  121   87   68   51    0    0
    1  4  0  996  302  248  189  145  111    0    0
    2  2  0  463  158  128  104   77   60    0    0
    2  4  0  997  324  273  220  168  130    0    0
    3  2  0  465  165  127   90   69   50    0    0
    3  4  0  987  336  268  201  150  112    0    0
    4  2  0  458  239  179  129   83   62    0    0
    4  4  0  973  478  375  270  189  135    0    0
```

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   5  2  0  456  163  135   94   73   53   42   25
   5  4  0  979  348  282  210  158  118   93   58
   6  1  0  226   81   57   46   27   25    0    0
   6  2  0  448  169  127   91   67   50    0    0
   6  3  0  713  263  204  148  108   82    0    0
   6  4  0  986  360  279  203  151  113    0    0
"09-04-86"  1  1  0  1  1040  1102   80   91   97  79  63
"Dynaflect"
   1  0  1.0  8  0.51  0.42  0.34  0.26  0.21
   2  0  1.0  8  0.60  0.50  0.41  0.32  0.26
   3  0  1.0  8  0.51  0.42  0.34  0.27  0.22
   4  0  1.0  8  0.63  0.51  0.41  0.32  0.25
   5  0  1.0  8  0.56  0.47  0.39  0.30  0.23
   6  0  1.0  8  0.48  0.40  0.33  0.27  0.21
"Road Rater 400"
   1  1  2  0   0.59   25.1    0.38    0.30    0.21    0.14
   1  2  2  0   1.26   25.2    0.88    0.73    1.79    0.40
   1  3  2  0   1.87   25.2    1.56    1.26    0.91    0.67
   2  1  2  0   0.61   25.1    0.41    0.32    0.24    0.16
   2  2  2  0   1.21   25.2    0.96    0.76    0.57    0.41
   2  3  2  0   1.88   25.2    1.76    1.36    0.97    3.52
   3  1  2  0   0.61   25.1    0.30    0.25    0.17    0.12
   3  2  2  0   1.25   25.2    0.79    0.67    0.47    0.35
   3  3  2  0   1.85   25.2    1.37    0.59    0.65    1.34
   4  1  2  0   0.61   25.1    0.54    0.44    0.32    0.23
   4  2  2  0   1.19   25.2    1.46    1.37    0.86    0.59
   4  3  2  0   1.78   25.2    1.78    2.57    1.87    1.37
   5  1  2  0   0.60   25.1    0.41    0.37    0.23    0.16
   5  2  2  0   1.23   25.2    1.04    0.87    0.61    0.45
   5  3  2  0   1.85   25.2    1.84    1.54    2.22    0.80
   6  1  1  0   0.62   15.1    0.42    0.36    0.26    0.18
   6  2  1  0   1.22   15.1    1.04    0.84    0.63    0.46
   6  1  2  0   0.60   25.0    0.41    0.31    0.21    0.41
   6  2  2  0   1.23   25.1    1.10    0.86    0.57    0.41
   6  3  2  0   1.83   25.1    1.91    1.23    0.94    2.64
   6  1  3  0   0.57   34.9    0.41    1.97    0.16    0.10
   6  2  3  0   1.14   34.9    1.12    2.67    0.52    0.35
   6  3  3  0   1.65   34.9    2.49    3.84    0.89    0.88
"Dynatest FWD"
   1  2  0  394  169  120   83   56   43   32   26
   1  4  0  899  382  285  199  142  104   82   54
   2  2  0  390  222  141   99   68   49    0    0
   2  4  0  893  465  331  235  164  119    0    0
   3  2  0  384  189  126   77   55   39   32   22
   3  4  0  892  403  285  191  134   99   78   54
   4  2  0  382  250  158  105   67   48    0    0
   4  4  0  883  524  369  248  168  116    0    0
   5  2  0  383  195  134   86   59   44   35   24
   5  4  0  885  426  310  211  147  107   82   49
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  380  202  122   83   56   44    0    0
   6  3  0  597  302  202  135   94   70    0    0
   6  4  0  882  425  300  203  141  105    0    0



"L13"  25  "SR"   14   2510  23.0    577  "N"
"F. 1.19m. w. of Akron C/L easterly to near Fulton/Kosciusko CL"    0.52
"F. 0.15m. e. of CR1000E (1.4m. w. of SR19) easterly (W8)"    0.25
1  12340  80   6  3.2   0.00   8.9   0.0  25.2  "6"
"A-2-4"   0  "SM-SC"  115.8   9.6  28  20.0  13.6   6.4  2.68
  0  2.6  0
2
"04-11-86"  1  1  0  1  1100  1130   73    0    0  53  51
"Dynaflect"
   1  0  1.0  8  0.56  0.45  0.32  0.24  0.16
   2  0  1.0  8  0.76  0.60  0.42  0.31  0.21
   3  0  1.0  8  0.64  0.51  0.36  0.26  0.17
   4  0  1.0  8  0.90  0.71  0.50  0.36  0.23
   5  0  1.0  8  0.57  0.47  0.33  0.25  0.18
   6  0  1.0  8  0.59  0.45  0.31  0.23  0.15
"Road Rater 400"
   1  1  2  0  0.61    25.1     0.44     0.28     0.33     0.18
   1  2  2  0  1.26    25.2     0.96     0.66     0.97     0.44
   1  3  2  0  1.84    25.2     1.49     1.42     0.57     0.70
   2  1  2  0  0.61    25.1     0.66     0.52     0.38     0.24
   2  2  2  0  1.23    25.2     1.45     1.14     0.74     0.56
   2  3  2  0  1.84    25.2     2.35     1.96     1.56     1.10
   3  1  2  0  0.60    25.1     0.52     0.34     0.23     0.21
   3  2  2  0  1.24    25.2     1.10     0.80     0.60     0.49
   3  3  2  0  1.82    25.2     1.75     1.92     1.21     0.62
   4  1  2  0  0.61    25.1     0.70     0.49     0.34     0.29
   4  2  2  0  1.22    25.1     1.51     2.05     0.87     0.86
   4  3  2  0  1.82    25.2     2.62     2.42     1.60     1.17
   5  1  1  0  0.62    15.2     0.38     0.25     0.09     0.12
   5  2  1  0  1.23    15.2     0.83     0.69     0.69     0.29
   5  1  2  0  0.62    25.2     0.48     0.38     0.31     0.19
   5  2  2  0  1.23    25.1     0.98     1.10     1.72     0.47
   5  3  2  0  1.84    25.1     1.67     0.98     2.85     0.83
   5  1  3  0  0.61    35.3     0.37     0.27     0.20     0.13
   5  2  3  0  1.22    35.3     0.82     0.68     0.51     0.36
   5  3  3  0  1.83    35.3     1.63     1.44     1.10     0.81
   6  1  2  0  0.61    25.1     0.51     1.05     0.25     0.16
   6  2  2  0  1.22    25.1     1.06     0.74     0.54     0.36
   6  3  2  0  1.84    25.2     1.84     1.31     0.90     0.64
"Dynatest FWD"
   1  2  0  422  145  120   90   64   45    0    0
   1  4  0  944  325  259  194  142  100    0    0
   2  2  0  411  203  156  110   78   55    0    0
   2  4  0  932  430  332  236  165  118    0    0
   3  2  0  408  179  137   91   65   45    0    0
   3  4  0  926  381  288  204  142  101    0    0
   4  2  0  422  259  191  133   89   62   44   26
   4  4  0  930  527  393  279  188  130   93   49
   5  2  0  416  156  122   91   60   43    0    0
   5  4  0  931  333  261  192  134   94    0    0
   6  1  0  201   74   69   41   28   16    0    0
   6  2  0  407  195  141   86   56   35    0    0
   6  3  0  665  298  210  134   89   57    0    0
   6  4  0  923  405  284  184  122   78    0    0
"08-25-86"  1  1  0  1  0938  1005   72   77   76  76  68
"Dynaflect"
   1  0  1.0  8  0.51  0.39  0.28  0.18  0.12
   2  0  1.0  8  0.65  0.49  0.33  0.22  0.14
   3  0  1.0  8  0.57  0.43  0.29  0.20  0.13
   4  0  1.0  8  0.67  0.52  0.36  0.25  0.17
   5  0  1.0  8  0.44  0.34  0.24  0.17  0.12
   6  0  1.0  8  0.46  0.34  0.24  0.17  0.12
"Road Rater 400"
   1  1  2  0   0.59    25.1     0.45     0.35     0.25     0.18
   1  2  2  0   1.20    25.0     0.92     0.73     0.52     0.48
   1  3  2  0   1.78    25.0     1.66     1.28     0.95     3.80
   2  1  2  0   0.58    24.9     0.61     0.57     0.37     0.26
   2  2  2  0   1.19    25.0     1.42     1.45     0.86     0.62
   2  3  2  0   1.79    25.0     2.68     2.58     1.66     1.37
   3  1  2  0   0.59    25.0     0.50     0.37     0.27     0.64
   3  2  2  0   1.22    25.0     1.14     0.86     0.63     0.93
   3  3  2  0   1.77    25.1     1.96     1.56     1.14     4.69
   4  1  2  0   0.60    25.0     0.67     0.52     0.39     0.49
   4  2  2  0   1.20    25.0     1.53     1.22     0.91     2.17
   4  3  2  0   1.77    25.1     2.73     2.22     1.65     2.13
   5  1  2  0   0.59    25.0     0.42     0.45     0.23     0.15
   5  2  2  0   1.20    25.0     1.07     0.78     0.60     0.43
   5  3  2  0   1.79    25.0     1.87     0.91     1.09     0.80
   6  1  1  0   0.59    14.9     0.31     0.23     0.15     0.09
   6  2  1  0   1.20    15.2     0.81     0.62     0.41     0.29
   6  1  2  0   0.58    24.9     0.43     0.30     0.20     0.13
   6  2  2  0   1.19    25.0     0.96     0.68     0.46     2.47
   6  3  2  0   1.79    25.1     1.80     1.33     0.91     2.56
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```
    6  1  3  0   0.59   35.1    0.39    0.25    0.16    0.98
    6  2  3  0   1.20   35.1    0.97    0.68    0.49    1.79
    6  3  3  0   1.79   35.1    2.08    1.51    1.02    1.89
"Dynatest FWD"
    1  2  0  378  166  111   74   51   34   22   12
    1  4  0  875  368  265  179  125   86   55   28
    2  2  0  377  226  146  104   71   50    0    0
    2  4  0  871  485  348  240  156  110    0    0
    3  2  0  376  186  126   85   54   38   27   16
    3  4  0  974  420  293  194  129   89   63   35
    4  2  0  372  271  171  116   72   52    0    0
    4  4  0  865  562  380  260  171  117    0    0
    5  2  0  371  164  115   70   47   33   21   16
    5  4  0  871  364  262  170  118   81   66   34
    6  1  0    0    0    0    0    0    0    0    0
    6  2  0  367  171  102   68   42   30    0    0
    6  3  0  587  263  166  106   70   47    0    0
    6  4  0  894  364  243  156  105   71    0    0



"L14"  66  "US"  421   3430  20.0    686  "N"
"F. SR114 northerly to SR14"    8.45
"F. CR100S (1.0m. s. of SR14N) southerly (SB)"    0.25
1  13850  82   4  1.0   0.00   4.9   0.0   6.6  "6"
"A-6"     4  "SC"        0.0  16.4  12  26.7  13.3  13.4  2.62
 52  4.6  0
2
"04-11-86"  1  1  0  1  1345  1415   77    0    0  60  51
"Dynaflect"
   1  0  1.0  8  1.16  0.83  0.55  0.37  0.25
   2  0  1.0  8  1.17  0.91  0.65  0.47  0.33
   3  0  1.0  8  0.87  0.67  0.46  0.32  0.21
   4  0  1.0  8  1.03  0.81  0.57  0.41  0.25
   5  0  1.0  8  1.03  0.76  0.50  0.37  0.26
   6  0  1.0  8  1.01  0.79  0.54  0.37  0.25
"Road Rater 400"
   1  1  2  0  0.61   25.2    0.74    0.53    0.46    0.22
   1  2  2  0  1.23   25.2    1.67    1.14    1.15    0.80
   1  3  2  0  1.85   25.2    2.91    2.95    1.77    1.31
   2  1  2  0  0.61   25.2    0.93    0.58    0.80    0.44
   2  2  2  0  1.25   25.2    2.11    2.05    1.68    1.05
   2  3  2  0  1.85   25.2    3.71    3.09    2.35    1.74
   3  1  2  0  0.61   25.2    0.78    0.56    0.32    0.27
   3  2  2  0  1.24   25.2    1.72    1.27    0.68    0.62
   3  3  2  0  1.83   25.2    3.00    2.49    1.62    0.93
   4  1  2  0  0.60   25.2    0.70    0.52    0.27    0.34
   4  2  2  0  1.23   25.2    1.61    1.18    0.75    0.84
   4  3  2  0  1.84   25.2    2.74    3.24    1.87    1.42
   5  1  2  0  0.61   25.2    0.62    0.42    0.19    0.22
   5  1  2  0  0.60   25.2    0.64    0.43    0.45    0.27
   5  2  2  0  1.24   25.2    1.39    1.26    1.05    0.63
   5  3  2  0  1.86   25.2    2.43    2.06    0.91    1.07
   6  1  1  0  0.64   15.3    0.65    0.49    0.51    0.24
   6  2  1  0  1.24   15.3    1.46    1.08    0.82    0.55
   6  1  2  0  0.62   25.3    0.85    0.65    0.35    0.38
   6  2  2  0  1.24   25.1    1.93    1.50    1.15    0.89
   6  3  2  0  1.82   25.1    3.41    2.75    2.54    1.66
   6  1  3  0  0.60   35.0    0.68    0.58    0.41    0.28
   6  2  3  0  1.20   35.0    1.63    1.44    0.82    0.71
   6  3  3  0  1.82   35.1    3.46    3.44    1.79    1.46
"Dynatest FWD"
   1  2  0  412  320  244  144   95   61    0    0
   1  4  0  921  654  497  327  209  139    0    0
   2  2  0  413  325  258  169  106   71    0    0
   2  4  0  920  714  545  356  233  154    0    0
   3  2  0  409  323  243  139   82   51    0    0
   3  4  0  909  632  468  296  175  112    0    0
   4  2  0  419  290  219  154   97   65    0    0
   4  4  0  896  589  457  314  211  139    0    0
   5  2  0  415  230  216  131   83   55   39   22
   5  4  0  909  575  447  287  186  122   86   77
   6  1  0  196  153  133   59   50   24    0    0
   6  2  0  400  337  253  152   98   59    0    0
   6  3  0  641  518  388  248  154   98    0    0
   6  4  0  899  693  521  338  215  135    0    0
"09-05-86"  1  1  0  1  1005  1028   81   82   87  74  66
"Dynaflect"
   1  0  1.0  8  0.76  0.57  0.40  0.26  0.18
   2  0  1.0  8  0.89  0.72  0.51  0.37  0.27
   3  0  1.0  8  0.67  0.50  0.34  0.22  0.16
   4  0  1.0  8  0.77  0.62  0.43  0.29  0.21
   5  0  1.0  8  0.70  0.52  0.37  0.25  0.18
   6  0  1.0  8  0.73  0.58  0.39  0.26  0.19
"Road Rater 400"
   1  1  2  0   0.63   25.0    0.78    0.66    0.48    0.34
   1  2  2  0   1.24   25.1    1.69    1.49    1.05    0.73
   1  3  2  0   1.84   25.1    2.96    2.64    1.86    2.01
   2  1  2  0   0.60   25.0    0.94    0.77    0.58    0.44
   2  2  2  0   1.23   25.1    2.07    1.83    1.35    0.99
   2  3  2  0   1.81   25.1    3.48    3.13    2.32    1.68
   3  1  2  0   0.62   25.0    0.69    0.55    0.36    0.23
   3  2  2  0   1.25   25.1    1.41    1.18    0.78    0.49
   3  3  2  0   1.83   25.1    2.43    2.12    1.32    0.82
   4  1  2  0   0.62   25.0    0.83    0.93    0.54    0.39
   4  2  2  0   1.23   25.1    1.85    1.65    1.22    0.89
   4  3  2  0   1.79   25.1    3.00    2.70    2.01    1.46
   5  1  2  0   0.62   25.1    0.51    0.43    0.37    0.21
   5  2  2  0   1.24   25.0    1.23    1.12    0.52    0.53
   5  3  2  0   1.81   25.1    2.03    1.80    0.99    0.89
   6  1  1  0   0.60   14.9    0.47    0.39    0.27    0.17
   6  2  1  0   1.19   14.9    1.25    1.02    0.71    0.44
   6  1  2  0   0.61   25.0    0.73    0.61    0.42    0.29
   6  2  2  0   1.22   25.0    1.65    1.42    0.93    0.65
   6  3  2  0   1.83   25.0    2.91    2.58    1.67    1.07
   6  1  3  0   0.58   35.1    0.84    0.38    0.48    0.34
   6  2  3  0   1.15   35.1    2.49    2.13    1.52    1.04
   6  3  3  0   1.80   35.1    4.26    3.71    2.54    1.64
"Dynatest FWD"
   1  2  0  392  345  236  131   76   50   34   19
   1  4  0  893  735  533  316  186  122   86   49
   2  2  0  385  365  254  155   90   62    0    0
   2  4  0  886  768  574  361  222  144    0    0
   3  2  0  389  300  203  100   59   37   25   14
   3  4  0  889  602  417  237  139   87   59   34
   4  2  0  386  339  224  133   78   52    0    0
   4  4  0  885  679  491  306  190  123    0    0
   5  2  0  383  310  179  100   58   38   24   15
   5  4  0  874  650  408  243  146   96   70   41
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  383  281  195  116   66   39    0    0
   6  3  0  601  423  308  182  109   65    0    0
   6  4  0  889  594  440  267  163   98    0    0



"L15"  75  "SR"   10   1190  16.5    196  "N"
"F. Jasper/Starke CL easterly to US421"    2.02
"F. 400' w. of CR1100W westerly (W8)"    0.25
1  12421  80   6  2.3   0.00   5.8   0.0   4.4  "G"
"A-3"     0  "SP"     105.2  16.0  18   0.0   0.0   0.0  2.66
 67  5.0  0
2
"04-14-86"  1  1  1  1  1.0  8  1030   47    0    0  45  45
"Dynaflect"
   1  0  1.0  8  1.16  0.92  0.91  0.46  0.31
   2  0  1.0  8  1.39  1.07  0.97  0.47  0.30
   3  0  1.0  8  1.44  1.15  1.09  0.56  0.35
   4  0  1.0  8  1.58  1.22  1.10  0.53  0.36
   5  0  1.0  8  1.61  1.28  1.23  0.61  0.40
   6  0  1.0  8  1.48  1.18  1.13  0.59  0.41
"Road Rater 400"
   1  1  2  0  0.61   24.9    1.05    0.74    0.58    0.39
   1  2  2  0  1.23   25.0    2.20    1.97    1.12    0.68
   1  3  2  0  1.79   25.0    3.96    3.20    1.99    1.23
   2  1  2  0  0.61   25.0    1.31    1.01    0.60    0.32
   2  2  2  0  1.22   25.0    2.60    2.03    1.28    0.70
   2  3  2  0  1.89   25.4    4.49    3.74    2.26    1.32
   3  1  2  0  0.59   24.9    1.14    0.89    0.53    0.41
   3  2  2  0  1.25   25.3    2.50    1.93    1.10    0.79
   3  3  2  0  1.82   25.0    3.97    3.85    2.10    1.26
   4  1  2  0  0.60   25.3    1.44    1.09    0.66    0.30
   4  2  2  0  1.21   24.9    2.74    1.97    1.21    0.66
   4  3  2  0  1.84   25.2    4.82    3.85    2.10    1.12
   5  1  2  0  0.56   25.0    1.11    1.53    0.48    0.32
   5  2  2  0  1.22   25.0    2.51    1.51    1.27    0.76
   5  3  2  0  1.81   25.0    4.34    3.67    2.25    1.37
   6  1  1  0  0.66   15.7    1.01    0.75    0.48    0.30
   6  2  1  0  1.28   15.3    2.21    1.78    1.12    0.69
   6  1  2  0  0.60   25.3    1.13    0.91    0.58    0.36
   6  2  2  0  1.26   25.3    2.36    2.16    1.15    0.66
   6  3  2  0  1.86   25.3    4.14    2.66    2.05    1.20
   6  1  3  0  0.59   35.3    1.08    0.66    0.39    0.16
   6  2  3  0  1.25   35.7    2.62    1.73    1.07    1.45
   6  3  3  0  1.83   35.4    4.63    3.89    2.39    1.16
"Road Rater 2000"
   1  1  2  0  0.63   24.9    0.70    0.49    0.37    0.20
   1  2  2  0  1.20   24.9    1.70    1.21    0.89    0.50
   1  3  2  0  1.84   25.0    2.88    2.02    1.48    0.84
   1  4  2  0  2.41   25.0    3.96    2.82    1.98    1.22
   1  5  2  0  3.63   24.9    6.79    4.98    3.33    1.93
   2  1  2  0  0.61   25.0    0.71    0.51    0.34    0.22
   2  2  2  0  1.15   25.0    1.80    1.34    0.89    0.55
   2  3  2  0  1.81   24.9    3.17    2.25    1.51    0.92
   2  4  2  0  2.36   24.9    4.44    3.16    2.11    1.29
   2  5  2  0  3.62   24.9    7.52    5.43    3.56    2.17
   3  1  2  0  0.61   24.9    0.70    0.52    0.37    0.23
   3  2  2  0  1.17   25.0    1.72    1.24    0.87    0.54
   3  3  2  0  1.79   25.0    3.04    2.22    1.52    0.94
   3  4  2  0  2.42   24.9    4.29    3.19    2.17    1.34
   3  5  2  0  3.58   24.9    7.08    5.41    3.60    2.23
   4  1  2  0  0.55   25.0    0.48    0.35    0.22    0.15
   4  2  2  0  1.17   25.0    1.91    1.33    0.81    0.48
   4  3  2  0  1.75   24.9    3.14    2.22    1.35    0.77
   4  4  2  0  2.39   25.0    4.68    3.30    1.98    1.12
   4  5  2  0  3.66   24.9    8.30    5.70    3.34    1.82
   5  1  2  0  0.62   24.9    0.84    0.56    0.36    0.21
   5  2  2  0  1.21   25.0    2.16    1.43    0.93    0.54
   5  3  2  0  1.81   24.9    3.49    2.37    1.51    0.88
   5  4  2  0  2.39   24.9    5.12    3.46    2.22    1.27
   5  5  2  0  3.55   24.9    8.75    5.88    3.79    2.14
   6  1  1  0  0.56   15.1    0.66    0.48    0.36    0.27
   6  2  1  0  1.20   15.0    1.81    1.32    0.94    0.61
   6  3  1  0  1.79   15.0    3.17    2.27    1.56    1.07
   6  4  1  0  2.40   15.0    4.65    3.29    2.23    1.51
   6  5  1  0  3.69   15.0    7.86    5.70    4.09    2.62
   6  1  2  0  0.62   25.2    0.77    0.53    0.35    0.21
   6  2  2  0  1.18   25.3    1.76    1.24    0.81    0.48
   6  3  2  0  1.76   25.2    2.90    2.07    1.36    0.80
   6  4  2  0  2.42   25.2    4.27    3.07    2.02    1.20
   6  5  2  0  3.59   25.3    7.16    5.15    3.38    2.00
   6  1  3  0  0.62   35.0    0.85    0.56    0.38    0.23
   6  2  3  0  1.20   35.0    1.85    1.30    0.84    0.50
   6  3  3  0  1.81   35.0    3.07    2.09    1.38    0.80
   6  4  3  0  2.38   35.0    4.31    2.89    1.91    1.13
   6  5  3  0  3.57   35.0    7.12    4.70    3.10    1.80
"Dynatest FWD"
   1  2  0  416   443   324   202   113   68    0    0
   1  4  0  887  925  677  417  235  134    0    0
   2  2  0  404  458  338  197  112   65    0    0
   2  4  0  878  998  729  443  242  136    0    0
   3  2  0  403  448  336  206  119   72    0    0
   3  4  0  880  988  724  465  265  158    0    0
   4  2  0  396  575  409  220  116   63    0    0
   4  4  0  866 1235  871  490  253  127    0    0
   5  2  0  398  496  372  226  131   76   53   38
   5  4  0  873 1060  786  469  265  148  103   85
   6  1  0  190  189  151   87   52   26    0    0
   6  2  0  388  429  313  191  111   68    0    0
   6  3  0  629  696  509  312  178  107    0    0
   6  4  0  862  957  695  429  244  142    0    0
"09-05-86"  1  1  0  1  0915  0938   79   81   87  71  68
"Dynaflect"
   1  0  1.0  8  1.04  0.80  0.53  0.34  0.24
   2  0  1.0  8  1.17  0.87  0.56  0.35  0.23
   3  0  1.0  8  1.23  0.92  0.62  0.39  0.26
   4  0  1.0  8  1.31  0.98  0.57  0.36  0.26
   5  0  1.0  8  1.31  1.03  0.65  0.43  0.30
   6  0  1.0  8  1.19  0.90  0.59  0.40  0.29
"Road Rater 400"
   1  1  2  0   0.60   24.8    0.98    0.73    0.53    0.30
   1  2  2  0   1.21   24.9    1.97    1.77    1.13    0.70
   1  3  2  0   1.30   24.9    3.51    3.03    1.90    1.15
   2  1  2  0   0.61   24.8    1.39    1.08    2.42    0.37
   2  2  2  0   1.23   24.9    2.51    2.21    1.28    0.77
   2  3  2  0   1.78   24.9    4.25    3.56    3.35    1.30
   3  1  2  0   0.63   24.8    1.10    1.00    0.64    0.39
   3  2  2  0   1.24   24.9    2.31    1.99    1.34    0.79
   3  3  2  0   1.80   24.9    3.81    3.38    2.17    1.29
   4  1  2  0   0.61   24.8    1.24    1.02    0.58    0.31
   4  2  2  0   1.22   24.9    2.56    2.06    1.18    0.64
   4  3  2  0   1.81   24.9    4.38    3.61    2.01    1.05
   5  1  2  0   0.60   24.9    0.99    0.83    0.56    0.32
   5  2  2  0   1.18   24.8    2.24    1.97    1.27    0.77
   5  3  2  0   1.78   24.9    3.83    3.34    2.16    1.27
   6  1  1  0   0.60   15.2    1.09    0.89    0.57    0.34
   6  2  1  0   1.27   15.3    2.19    1.68   10.86    1.74
   6  1  2  0   0.60   24.9    0.99    1.44    0.49    0.27
   6  2  2  0   1.23   25.0    2.19    1.82    1.11    0.62
   6  3  2  0   1.83   25.0    3.71    3.06    1.84    1.01
   6  1  3  0   0.59   34.7    1.25    1.05    1.24    0.38
   6  2  3  0   1.30   34.7    3.24    3.04    2.02    1.11
   6  3  3  0   1.81   34.8    5.29    5.07   15.08   19.05
"Dynatest FWD"
   1  2  0  395  422  282  162   89   53   39   25
   1  4  0  905  964  670  376  203  115   83   58
   2  2  0  394  448  291  170   88   52    0    0
   2  4  0  900 1030  695  390  207  115    0    0
   3  2  0  390  445  295  172   92   53   38   26
   3  4  0  892 1057  736  421  232  125   85   61
   4  2  0  390  612  355  185   84   47    0    0
   4  4  0  885 1300  825  430  204  109    0    0
   5  2  0  387  497  351  184  106   59   42   32
   5  4  0  887 1110  759  415  218  125   92   74
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  386  483  315  170   95   53    0    0
   6  3  0  609  743  498  269  143   86    0    0
   6  4  0  886 1095  724  396  206  118    0    0


"L16"  37  "SR"  114   4110  21.0    863  "N"
"F. 2.5m. e. of Newton/Jasper CL easterly"    5.00
"F. CR700W (near Rensselaer) easterly (EB)"    0.25
1   8092  69  17  2.1   0.00   4.2   0.0   6.1  "G"
"A-2-4"   0  "SM"     106.7  10.5  37   0.0   0.0   0.0  2.65
 38  2.3  0
```

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2
"04-16-86"  1  1  0  1  1545  1615   42    0    0  42  49
"Dynaflect"
   1  0  1.0  8  0.70  0.51  0.33  0.20  0.11
   2  0  1.0  8  0.96  0.74  0.51  0.33  0.19
   3  0  1.0  8  1.12  0.83  0.55  0.33  0.18
   4  0  1.0  8  1.45  1.10  0.76  0.46  0.28
   5  0  1.0  8  1.14  0.87  0.60  0.37  0.21
   6  0  1.0  8  1.06  0.83  0.60  0.41  0.26
"Road Rater 400"
   1  1  2  0  0.60   24.9    0.81    0.64    0.40    0.24
   1  2  2  0  1.23   25.0    1.64    1.31    0.87    0.56
   1  3  2  0  1.83   25.0    2.00    2.67    1.53    3.55
   2  1  2  0  0.59   25.0    0.99    0.85    0.64    0.45
   2  2  2  0  1.18   24.7    2.03    1.90    1.47    1.09
   2  3  2  0  1.87   25.3    3.71    3.59    2.69    2.01
   3  1  2  0  0.64   25.5    1.27    1.03    0.85    0.51
   3  2  2  0  1.30   25.6    2.70    2.03    1.78    1.24
   3  3  2  0  1.83   24.9    4.37    3.80    2.89    1.44
   4  1  2  0  0.57   24.5    1.39    0.99    0.92    0.40
   4  2  2  0  1.14   24.5    3.03    2.09    1.89    1.50
   4  3  2  0  1.75   24.6    5.15    4.34    3.37    3.02
   5  1  2  0  0.58   24.5    1.14    0.93    0.70    0.20
   5  2  2  0  1.21   24.8    2.55    2.51    1.60    1.07
   5  3  2  0  1.77   24.8    4.39    5.11    2.67    2.04
   6  1  1  0  0.59   14.9    0.93    0.78    0.53    3.51
   6  2  1  0  1.22   14.8    2.18    1.85    1.32    5.05
   6  1  2  0  0.61   25.2    0.94    0.79    0.58    1.33
   6  2  2  0  1.29   25.5    2.05    1.67    1.21    1.99
   6  3  2  0  1.76   24.7    3.34    2.67    1.87    2.99
   6  1  3  0  0.59   35.2    0.75    0.49    0.45    0.33
   6  2  3  0  1.15   34.6    1.59    1.10    0.94    0.80
   6  3  3  0  1.85   35.7    3.50    2.61    1.77    1.30
"Dynatest FWD"
   1  2  0  430   308  228  121    71    42    0    0
   1  4  0  919   665  477  271   155    92    0    0
   2  2  0  428   357  270  181   106    70    0    0
   2  4  0  897   786  588  384   238   153    0    0
   3  2  0  424   413  308  193   117    73    0    0
   3  4  0  906   902  658  419   256   158    0    0
   4  2  0  420   614  423  249   146    91    0    0
   4  4  0  896  1255  878  529   314   195    0    0
   5  2  0  419   419  322  204   128    77   51   26
   5  4  0  897   888  670  435   273   167  110   66
   6  1  0  217   163  129   84    59    42    0    0
   6  2  0  421   361  262  173   106    76    0    0
   6  3  0  664   562  420  267   177   125    0    0
   6  4  0  907   776  568  370   236   164    0    0
"09-05-86"  1  1  0  1  1111  1140   78   90   88  76  69
"Dynaflect"
   1  0  1.0  8  0.63  0.42  0.26  0.14  0.09
   2  0  1.0  8  0.90  0.65  0.40  0.24  0.15
   3  0  1.0  8  1.00  0.70  0.41  0.23  0.13
   4  0  1.0  8  1.29  0.91  0.57  0.34  0.20
   5  0  1.0  8  1.03  0.75  0.49  0.28  0.17
   6  0  1.0  8  1.01  0.75  0.48  0.31  0.21
"Road Rater 400"
   1  1  2  0   0.61   25.1    1.03    1.00    0.46    0.35
   1  2  2  0   1.25   25.1    1.78    1.36    0.87    0.57
   1  3  2  0   1.83   25.1    3.01    2.29    1.43    1.86
   2  1  2  0   0.61   25.1    1.16    0.98    0.68    0.56
   2  2  2  0   1.23   25.1    2.58    2.22    1.64    1.27
   2  3  2  0   1.84   25.1    4.27    3.81    2.77    2.14
   3  1  2  0   0.63   25.1    1.25    1.15    0.74    0.52
   3  2  2  0   1.24   25.1    2.79    2.43    1.68    1.15
   3  3  2  0   1.82   25.1    4.96    4.28    2.95    1.99
   4  1  2  0   0.62   25.1    1.52    1.34    1.02    0.79
   4  2  2  0   1.22   25.1    3.49    3.04    2.28    1.73
   4  3  2  0   1.85   25.1    5.70    4.95    3.65    2.77
   5  1  2  0   0.61   25.1    1.32    1.20    0.90    0.70
   5  2  2  0   1.26   25.1    3.13    2.82    2.10    1.64
   5  3  2  0   1.82   25.1    4.97    4.53    3.29    2.54
   6  1  1  0   0.58   14.8    0.76    0.60    0.41    0.27
   6  2  1  0   1.19   14.8    1.90    1.55    1.02    0.67
   6  1  2  0   0.60   24.9    0.99    0.82    0.58    1.94
   6  2  2  0   1.23   25.0    2.24    1.88    1.36    1.02
   6  3  2  0   1.82   25.0    3.55    2.97    2.09    1.53
   6  1  3  0   0.58   35.1    0.83    0.62    0.38    0.26
   6  2  3  0   1.29   35.1    2.62    2.08    1.29    0.85
   6  3  3  0   1.78   35.1    3.92    3.14    1.91    1.29
"Dynatest FWD"
   1  2  0  380  303  168   83   47   29   21   12
   1  4  0  880  678  407  208  111   67   51   28
   2  2  0  374  412  242  135   75   47    0    0
   2  4  0  863  911  577  323  185  113    0    0
   3  2  0  377  498  308  155   85   51   37   16
   3  4  0  871  1083 693  374  201  118   73   50
   4  2  0  370  644  368  194  105   66    0    0
   4  4  0  855  1355 851  458  261  156    0    0
   5  2  0  368  447  300  163   95   56   44   22
   5  4  0  851  979  671  386  219  132   92   53
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  369  401  259  138   85   59    0    0
   6  3  0  573  632  418  229  140   93    0    0
   6  4  0  843  929  605  337  204  135    0    0



"L17"  37  "SR"   10   3200  21.0    672  "N"
"F. Newton/Jasper CL easterly"   4.02
"F. e. of I65 easterly (EB)"   0.30
1  13892  83   3  1.1   0.00   5.5   0.0   0.0  "N"
"A-2-4"   0  "SM"     107.8  10.3  37   0.0   0.0   0.0  2.66
 84  5.0  0
2
"04-17-86"  1  1  1  1  0845  0915   52    0    0  48  47
"Dynaflect"
   1  0  1.0  8  0.85  0.65  0.58  0.27  0.18
   2  0  1.0  8  0.75  0.57  0.53  0.27  0.18
   3  0  1.0  8  0.82  0.59  0.38  0.24  0.15
   4  0  1.0  8  0.72  0.57  0.41  0.28  0.19
   5  0  1.0  8  0.75  0.57  0.37  0.25  0.17
   6  0  1.0  8  0.86  0.64  0.42  0.28  0.18
"Road Rater 400"
   1  1  2  0  0.59   24.8    0.73    0.55    0.36    0.30
   1  2  2  0  1.23   24.9    1.62    1.32    0.81    0.40
   1  3  2  0  1.79   24.9    2.72    2.24    1.45    0.78
   2  1  2  0  0.59   24.9    0.59    0.42    0.22    0.11
   2  2  2  0  1.19   24.8    1.37    0.95    0.57    0.18
   2  3  2  0  1.79   24.8    2.34    2.16    1.12    1.13
   3  1  2  0  0.60   24.8    0.72    0.43    0.23    0.08
   3  2  2  0  1.20   24.8    1.64    1.16    0.39    0.31
   3  3  2  0  1.82   25.0    3.10    2.28    1.28    0.63
   4  1  2  0  0.58   24.8    0.48    0.28    0.20    0.07
   4  2  2  0  1.24   25.1    1.20    0.82    0.54    0.21
   4  3  2  0  1.77   24.8    1.88    1.61    0.91    0.92
   5  1  2  0  0.57   24.8    0.55    0.31    0.64    0.13
   5  2  2  0  1.24   25.2    1.46    1.24    1.10    0.47
   5  3  2  0  1.79   24.9    2.48    2.49    1.09    1.26
   6  1  1  0  0.64   15.3    0.67    0.49    0.27    0.12
   6  2  1  0  1.23   15.2    1.52    1.09    0.71    0.40
   6  1  2  0  0.57   24.5    0.78    0.59    0.42    0.21
   6  2  2  0  1.16   24.5    1.51    1.11    0.71    0.41
   6  3  2  0  1.85   25.3    2.85    2.22    1.32    0.76
   6  1  3  0  0.54   35.2    0.55    0.43    0.24    0.07
   6  2  3  0  1.20   35.5    1.58    1.33    0.75    0.28
   6  3  3  0  1.78   35.2    3.71    3.05    1.86    0.90
"Road Rater 2000"
   1  1  2  0  0.57   25.0    0.61    0.35    0.23    0.14
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    1  2  2  0  1.18   24.9    1.34    0.85    0.54    0.32
    1  3  2  0  1.81   24.9    2.25    1.45    0.92    0.54
    1  4  2  0  2.38   24.9    3.18    2.05    1.31    0.76
    1  5  2  0  3.54   24.9    5.47    3.60    2.31    1.33
    2  1  2  0  0.57   24.9    0.41    0.26    0.22    0.12
    2  2  2  0  1.16   24.9    0.96    0.64    0.42    0.26
    2  3  2  0  1.74   24.9    1.55    1.05    0.70    0.41
    2  4  2  0  2.39   25.0    2.34    1.61    1.06    0.62
    2  5  2  0  3.60   24.9    4.11    2.93    1.79    1.08
    3  1  2  0  0.56   24.9    0.48    0.33    0.21    0.14
    3  2  2  0  1.21   25.0    1.19    0.81    0.53    0.32
    3  3  2  0  1.76   24.9    2.05    1.45    0.92    0.54
    3  4  2  0  2.42   25.0    3.15    2.19    1.37    0.79
    3  5  2  0  3.60   25.0    5.58    4.00    2.49    1.42
    4  1  2  0  0.58   24.9    0.41    0.30    0.19    0.12
    4  2  2  0  1.18   24.9    0.92    0.68    0.44    0.26
    4  3  2  0  1.86   25.0    1.56    1.14    0.76    0.45
    4  4  2  0  2.38   24.9    2.17    1.60    1.05    0.60
    4  5  2  0  3.61   24.9    3.59    2.72    1.81    1.06
    5  1  2  0  0.64   24.9    0.45    0.35    0.22    0.14
    5  2  2  0  1.17   24.9    0.96    0.72    0.48    0.29
    5  3  2  0  1.78   24.9    1.71    1.26    0.81    0.49
    5  4  2  0  2.40   24.9    2.52    1.86    1.19    0.70
    5  5  2  0  3.62   25.0    4.49    3.37    2.12    1.25
    6  1  1  0  0.60   15.0    0.53    0.40    0.25    0.17
    6  2  1  0  1.21   15.0    1.23    0.89    0.60    0.37
    6  3  1  0  1.83   15.0    1.98    1.44    0.98    0.62
    6  4  1  0  2.36   15.0    3.08    2.19    1.42    0.92
    6  5  1  0  3.55   15.0    5.22    4.10    2.49    1.48
    6  1  2  0  0.60   24.9    0.50    0.35    0.23    0.14
    6  2  2  0  1.21   25.0    1.20    0.84    0.54    0.34
    6  3  2  0  1.77   25.0    1.95    1.36    0.86    0.50
    6  4  2  0  2.38   25.0    2.82    1.99    1.24    0.72
    6  5  2  0  3.61   25.0    4.99    3.55    2.21    1.30
    6  1  3  0  0.61   35.1    0.59    0.40    0.27    0.18
    6  2  3  0  1.25   35.1    1.37    0.96    0.62    0.37
    6  3  3  0  1.82   35.1    2.27    1.59    1.05    0.63
    6  4  3  0  2.38   35.1    3.34    2.34    1.56    0.94
    6  5  3  0  3.62   35.1    5.96    4.24    2.82    1.72
"Dynatest FWD"
    1  2  0  430  312  243  129   77   44    0    0
    1  4  0  919  610  462  278  163   98    0    0
    2  2  0  424  267  186  120   69   44    0    0
    2  4  0  912  533  402  257  161   99    0    0
    3  2  0  420  359  247  127   70   39    0    0
    3  4  0  900  646  446  255  145   86    0    0
    4  2  0  424  218  170  111   67   43    0    0
    4  4  0  918  447  356  229  149   94    0    0
    5  2  0  414  282  216  113   67   39   25   17
    5  4  0  910  544  414  241  142   88   61   37
    6  1  0  183  121   92   44   28   15    0    0
    6  2  0  415  300  206  126   68   42    0    0
    6  3  0  662  443  328  184  112   68    0    0
    6  4  0  904  542  413  246  147   92    0    0
"09-05-86"  1  1  0  1  0815  0840   64   72   76  63  65
"Dynaflect"
    1  0  1.0  8  0.71  0.49  0.31  0.19  0.14
    2  0  1.0  8  0.64  0.45  0.29  0.19  0.14
    3  0  1.0  8  0.67  0.47  0.29  0.18  0.13
    4  0  1.0  8  0.58  0.44  0.29  0.19  0.15
    5  0  1.0  8  0.57  0.41  0.26  0.18  0.14
    6  0  1.0  8  0.68  0.49  0.30  0.20  0.14
"Road Rater 400"
    1  1  2  0   0.59   25.1    0.92    0.80    0.46    0.42
    1  2  2  0   1.21   25.1    1.60    1.34    0.77    0.43
    1  3  2  0   1.87   25.2    2.99    2.48    1.44    0.79
    2  1  2  0   0.60   25.1    0.71    0.56    0.31    0.16
    2  2  2  0   1.24   25.2    1.41    1.00    0.61    0.32
    2  3  2  0   1.84   25.2    2.43    2.00    1.08    0.56
    3  1  2  0   0.60   25.1    0.68    0.54    0.42    0.18
```

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   3  2  2  0   1.25   25.2    1.51    1.49    0.72    0.39
   3  3  2  0   1.89   25.2    2.78    2.78    1.29    0.68
   4  1  2  0   0.63   25.2    0.60    0.49    0.32    0.23
   4  2  2  0   1.24   25.2    1.17    1.08    0.66    0.39
   4  3  2  0   1.84   25.2    2.00    1.73    1.11    0.68
   5  1  2  0   0.64   25.2    0.58    0.47    0.27    0.15
   5  2  2  0   1.27   25.2    1.37    1.16    0.65    0.36
   5  3  2  0   1.85   25.2    2.39    2.04    1.08    0.57
   6  1  1  0   0.58   14.9    0.89    0.75    0.46    0.27
   6  2  1  0   1.19   14.9    1.30    1.07    0.65    0.39
   6  1  2  0   0.62   25.0    0.75    0.60    0.35    0.22
   6  2  2  0   1.25   25.0    1.58    1.33    0.74    0.41
   6  3  2  0   1.82   25.0    2.64    2.22    1.24    0.69
   6  1  3  0   0.61   34.9    1.00    0.80    0.46    0.27
   6  2  3  0   1.21   34.9    2.68    2.27    1.33    0.75
   6  3  3  0   1.76   34.9    4.08    3.35    2.00    1.15
"Dynatest FWD"
   1  2  0  412  322  207  112   59   36   27   16
   1  4  0  933  675  455  254  141   87   61   41
   2  2  0  411  316  191  103   53   33    0    0
   2  4  0  928  669  437  245  135   83    0    0
   3  2  0  408  336  221  106   57   33   22   10
   3  4  0  926  658  435  237  129   78   55   32
   4  2  0  412  222  161  101   59   35    0    0
   4  4  0  931  477  354  225  138   84    0    0
   5  2  0  404  278  189   98   52   33   23   15
   5  4  0  921  677  407  223  124   78   56   36
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  401  310  193  110   58   34    0    0
   6  3  0  627  430  291  162   93   57    0    0
   6  4  0  919  598  397  228  130   79    0    0



"58"   31  "US"  150   4100   8.0    328  "S"
"F. Washington/Harrison CL to 1.0m. e. of SR135"    3.46
"F. Buffalo Trace Park entrance (0.75m. e. of SR135) westerly (EB)" 0.25
1  15114  85   1  2.1   0.00  12.1   0.0  13.2  "G"
"A-6"    13  "CL"     107.6  20.7   9  39.9  17.9  22.0  2.70
 90  5.0  0
3
"03-20-86"  1  1  1  0  1515  1545   38   48    0  35  50
"Dynaflect"
   1  0  1.0  8  0.54  0.41  0.31  0.26  0.17
   2  0  1.0  8  0.39  0.29  0.24  0.22  0.15
   3  0  1.0  8  0.42  0.32  0.27  0.23  0.16
   4  0  1.0  8  0.49  0.38  0.31  0.27  0.19
   5  0  1.0  8  0.57  0.46  0.38  0.33  0.24
   6  0  1.0  8  0.46  0.36  0.32  0.27  0.19
"Road Rater 400"
   1  1  2  0  0.65   25.4    0.74    0.52    0.41    1.58
   1  2  2  0  1.27   25.4    1.13    1.11    0.82    0.34
   1  3  2  0  1.86   25.4    1.67    1.50    1.26    1.86
   2  1  2  0  0.62   25.3    0.50    0.34    0.29    0.25
   2  2  2  0  1.27   25.4    1.32    0.68    0.55    0.85
   2  3  2  0  1.85   25.4    1.48    1.07    0.76    0.85
   3  1  2  0  0.60   25.3    0.48    0.87    0.30    0.27
   3  2  2  0  1.27   25.4    0.92    0.77    0.60    0.52
   3  3  2  0  1.86   25.4    1.36    0.99    1.98    1.84
   4  1  2  0  0.61   25.2    0.44    0.32    0.29    0.30
   4  2  2  0  1.25   25.2    0.98    0.67    0.97    0.76
   4  3  2  0  1.85   25.2    1.27    1.15    0.85    0.82
   5  1  2  0  0.64   25.1    0.68    0.50    0.38    0.36
   5  2  2  0  1.25   25.2    1.43    1.26    0.83    0.68
   5  3  2  0  1.84   25.2    1.96    1.40    1.20    1.18
   6  1  1  0  0.67   15.2    0.93    1.34    0.70    7.39
   6  2  1  0  1.24   15.3    1.23    1.45    0.91    1.14
   6  1  2  0  0.60   24.9    0.34    0.27    0.21    0.20
   6  2  2  0  1.20   24.9    0.68    0.60    0.48    0.39
   6  3  2  0  1.80   25.0    1.01     0.67     0.69     0.58
   6  2  3  0  1.19   34.4    0.97     0.88     0.73     0.74
   6  3  3  0  1.74   34.5    1.29     1.19     1.01     1.92
   6  3  3  0  1.56   35.1    1.33     0.98     1.02     0.93
"Road Rater 2000"
   1  1  2  0  0.59   25.0    0.05     0.34     0.35     0.23
   1  2  2  0  1.20   25.0    0.11     0.73     0.76     0.51
   1  3  2  0  1.78   25.0    0.13     1.10     1.16     0.77
   1  4  2  0  2.38   25.0    0.09     1.48     1.51     1.03
   2  1  2  0  0.56   25.0    0.08     0.19     0.18     0.12
   2  2  2  0  1.18   25.0    0.14     0.39     0.37     0.24
   2  3  2  0  1.77   25.0    0.13     0.58     0.57     0.38
   2  4  2  0  2.42   25.0    0.08     0.79     0.80     0.52
   3  1  2  0  0.56   25.0    0.07     0.19     0.21     0.14
   3  2  2  0  1.19   25.0    0.13     0.43     0.45     0.26
   3  3  2  0  1.83   25.0    0.09     0.66     0.67     0.39
   3  4  2  0  2.39   25.0    0.09     0.88     0.93     0.53
   4  1  2  0  0.62   25.0    0.07     0.25     0.21     0.18
   4  2  2  0  1.16   25.0    0.14     0.50     0.39     0.32
   4  3  2  0  1.81   25.0    0.10     0.76     0.61     0.52
   4  4  2  0  2.44   25.0    0.10     1.07     0.86     0.71
   5  1  2  0  0.59   25.0    0.06     0.29     0.22     0.18
   5  2  2  0  1.20   25.0    0.12     0.62     0.49     0.40
   5  3  2  0  1.79   25.0    0.14     0.96     0.73     0.61
   5  4  2  0  2.39   25.1    0.10     1.33     1.02     0.84
   6  1  1  0  0.61   15.0    0.11     0.23     0.20     0.15
   6  2  1  0  1.21   15.0    0.13     0.45     0.40     0.31
   6  3  1  0  1.81   15.0    0.13     0.72     0.69     0.50
   6  4  1  0  2.38   15.0    0.09     0.95     0.92     0.70
   6  1  2  0  0.59   25.2    0.07     0.21     0.20     0.15
   6  2  2  0  1.24   25.1    0.13     0.47     0.41     0.32
   6  3  2  0  1.76   25.2    0.14     0.67     0.60     0.46
   6  4  2  0  2.44   25.2    0.12     0.96     0.82     0.65
   6  1  3  0  0.61   35.0    0.09     0.21     0.17     0.17
   6  2  3  0  1.24   35.1    0.15     0.43     0.34     0.30
   6  3  3  0  1.83   35.0    0.11     0.64     0.49     0.45
   6  4  3  0  2.40   35.1    0.13     0.86     0.66     0.60
"04-23-86"  0  0  0  1  1330  1400   89     0     0  66  52
"Dynatest FWD"
   1  2  0  407  188  155  100   69   48    0    0
   1  4  0  874  413  340  227  159  110    0    0
   2  2  0  403  147  110   78   56   40    0    0
   2  4  0  869  314  247  181  130   91    0    0
   3  2  0  402  172  119   81   56   38    0    0
   3  4  0  867  373  270  188  132   92    0    0
   4  2  0  403  180  138  100   70   50    0    0
   4  4  0  867  389  311  225  162  114    0    0
   5  2  0  398  224  164  116   83   61   44   28
   5  4  0  862  470  358  253  183  132   98   53
   6  1  0  169   72   51   37   25   18    0    0
   6  2  0  398  186  138   99   69   48    0    0
   6  3  0  630  294  225  161  114   81    0    0
   6  4  0  863  396  307  223  159  113    0    0
"08-07-86"  1  0  1  1  1005  1045   93   90   96  88  69
"Dynaflect"
   1  0  1.0  8  0.58  0.47  0.33  0.31  0.15
   2  0  1.0  8  0.48  0.39  0.28  0.19  0.13
   3  0  1.0  8  0.48  0.38  0.27  0.19  0.13
   4  0  1.0  8  0.58  0.46  0.35  0.25  0.17
   5  0  1.0  8  0.67  0.54  0.41  0.30  0.23
   6  0  1.0  8  0.56  0.46  0.35  0.26  0.19
"Road Rater 2000"
   1  1  2  0  0.63   25.1    0.64     0.47     0.42     0.30
   1  2  2  0  1.23   25.1    1.31     0.97     0.86     0.58
   1  3  2  0  1.83   25.1    2.07     1.48     1.24     0.91
   1  4  2  0  2.41   25.2    2.81     2.03     1.65     1.22
   1  5  2  0  3.61   25.1    4.63     3.31     2.57     1.95
   2  1  2  0  0.60   25.2    0.49     0.28     0.22     0.15
   2  2  2  0  1.20   25.2    1.02     0.59     0.43     0.31
   2  3  2  0  1.82   25.1    1.57     0.93     0.66     0.48
```

```
 2  4  2  0  2.40   25.1    2.17    1.30    0.92    0.67
 2  5  2  0  3.56   25.2    3.46    2.04    1.46    1.04
 3  1  2  0  0.60   25.2    0.46    0.29    0.19    0.15
 3  2  2  0  1.20   25.2    0.93    0.62    0.40    0.31
 3  3  2  0  1.84   25.1    1.51    0.99    0.64    0.48
 3  4  2  0  2.41   25.2    2.05    1.32    0.87    0.64
 3  5  2  0  3.59   25.1    3.33    2.17    1.49    1.00
 4  1  2  0  0.57   25.2    0.52    0.34    0.23    0.20
 4  2  2  0  1.20   25.2    1.11    0.74    0.48    0.43
 4  3  2  0  1.80   25.2    1.73    1.16    0.75    0.66
 4  4  2  0  2.44   25.1    2.48    1.66    1.07    0.93
 4  5  2  0  3.60   25.1    4.00    2.69    1.82    1.48
 5  1  2  0  0.64   25.1    0.64    0.38    0.31    0.24
 5  2  2  0  1.17   25.1    1.28    0.74    0.60    0.46
 5  3  2  0  1.79   25.1    2.04    1.19    0.94    0.72
 5  4  2  0  2.43   25.2    2.94    1.74    1.34    1.02
 5  5  2  0  3.58   25.1    4.92    2.85    2.19    1.62
 6  1  1  0  0.62   15.1    0.41    0.30    0.25    0.18
 6  2  1  0  1.21   15.1    0.88    0.63    0.49    0.37
 6  3  1  0  1.82   15.1    1.39    0.99    0.77    0.58
 6  4  1  0  2.40   15.1    2.04    1.42    1.07    0.76
 6  5  1  0  3.58   15.2    4.05    2.97    2.07    1.43
 6  1  2  0  0.60   25.1    0.43    0.29    0.23    0.17
 6  2  2  0  1.23   25.1    0.94    0.66    0.51    0.37
 6  3  2  0  1.80   25.1    1.45    1.02    0.77    0.56
 6  4  2  0  2.39   25.2    2.04    1.43    1.08    0.77
 6  5  2  0  3.58   25.1    3.38    2.38    1.75    1.23
 6  1  3  0  0.59   35.3    0.43    0.31    0.25    0.18
 6  2  3  0  1.22   35.2    0.92    0.65    0.50    0.37
 6  3  3  0  1.83   35.3    1.47    1.03    0.80    0.58
 6  4  3  0  2.43   35.3    2.05    1.45    1.11    0.81
 6  5  3  0  3.63   35.3    3.40    2.37    1.80    1.28
"Dynatest FWD"
   1  2  0  397  189  143   93   64   43   30   18
   1  4  0  842  414  321  216  146  100   68   39
   2  2  0  397  162   98   66   46   31    0    0
   2  4  0  836  346  218  149  104   74    0    0
   3  2  0  398  161  104   68   46   31   24   13
   3  4  0  844  352  238  158  109   75   55   29
   4  2  0  390  177  133   86   62   43    0    0
   4  4  0  834  390  299  206  144   98    0    0
   5  2  0  391  200  144   95   68   51   40   24
   5  4  0  836  424  311  214  153  113   87   51
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  386  177  122   86   62   41    0    0
   6  3  0  615  280  201  141   98   69    0    0
   6  4  0  832  391  284  199  136   97    0    0



"59"   69  "US"  421   2280  10.0    228  "S"
"F. Jefferson/Ripley CL to US50"   12.59
"F. CR1050S (0.6m. n. of Jefferson/Ripley CL) northerly (NB)"       0.25
1  10479  76  10  1.4   0.00  11.0   0.0  17.5  "6"
"A-6"   12  "CL"     101.3  24.3  12  38.2  17.2  21.0  2.59
 60  3.6  0
2
"03-24-86"  1  1  1  1  0850  0920   40    0    0  35  40
"Dynaflect"
   1  0  1.0  8  0.56  0.44  0.34  0.27  0.17
   2  0  1.0  8  0.77  0.58  0.42  0.31  0.17
   3  0  1.0  8  0.87  0.66  0.47  0.33  0.19
   4  0  1.0  8  0.61  0.46  0.35  0.27  0.16
   5  0  1.0  8  0.74  0.57  0.42  0.31  0.18
   6  0  1.0  8  0.71  0.55  0.37  0.29  0.16
"Road Rater 400"
   1  1  2  0  0.63   25.0    0.60    0.97    0.48    1.77
   1  2  2  0  1.23   25.1    1.34    1.29    1.11    2.05
   1  3  2  0  1.82   25.1    4.50    5.13    3.90    3.70
   2  1  2  0  0.62   25.1    0.85    0.73    0.72    0.28
   2  2  2  0  1.21   25.1    2.11    2.09    0.45    2.85
   2  3  2  0  1.78   25.1    6.60    6.55    5.58    4.54
   3  1  2  0  0.62   25.1    1.26    0.70    1.87    0.79
   3  2  2  0  1.23   25.1    2.51    1.95    1.37    1.59
   3  3  2  0  1.86   25.2    4.44    3.96    3.37    4.10
   4  1  2  0  0.63   25.1    0.84    0.51    0.65    1.49
   4  2  2  0  1.24   25.1    1.56    1.07    1.99    0.83
   4  3  2  0  1.85   25.2    2.67    2.32    2.25    1.52
   5  1  2  0  0.61   25.1    0.99    0.51    1.26    2.00
   5  2  2  0  1.22   25.1    2.02    1.18    1.64    0.62
   5  3  2  0  1.83   25.2    3.48    2.70    2.55    1.93
   6  1  1  0  0.59   15.1    1.87    2.69    1.65    8.86
   6  2  1  0  1.22   15.1    2.64    2.64    2.39    4.97
   6  1  2  0  0.60   25.0    1.07    0.80    1.50    1.79
   6  2  2  0  1.19   25.0    2.26    1.59    1.66    2.44
   6  3  2  0  1.83   25.1    3.58    3.14    2.64    3.07
   6  1  3  0  0.58   35.3    0.78    0.59    0.48    0.38
   6  1  3  0  0.86   35.3    2.03    1.72    8.59   14.99
   6  2  3  0  1.26   35.3    2.21    1.34    6.27    1.13
"Road Rater 2000"
   1  1  2  0  0.59   24.9    0.06    0.42    0.42    0.31
   1  2  2  0  1.22   24.9    0.12    1.02    0.82    0.74
   1  3  2  0  1.83   24.9    0.11    1.69    1.32    1.22
   1  4  2  0  2.40   24.9    0.10    2.40    1.92    1.74
   2  1  2  0  0.63   24.9    0.07    0.73    0.57    0.45
   2  2  2  0  1.20   24.9    0.14    1.61    1.28    1.03
   2  3  2  0  1.80   24.9    0.12    2.64    2.13    1.72
   2  4  2  0  2.41   24.9    0.12    3.73    3.02    2.45
   3  1  2  0  0.58   25.0    0.08    0.74    0.62    0.52
   3  2  2  0  1.22   25.0    0.12    1.72    1.38    1.20
   3  3  2  0  1.80   25.1    0.14    2.56    2.06    1.82
   3  4  2  0  2.43   25.1    0.13    3.57    2.82    2.46
   4  1  2  0  0.60   25.1    0.09    0.44    0.42    0.28
   4  2  2  0  1.19   25.0    0.13    0.96    0.88    0.62
   4  3  2  0  1.83   25.0    0.09    1.58    1.34    1.02
   4  4  2  0  2.40   25.1    0.13    2.22    1.75    1.41
   5  1  2  0  0.60   25.0    0.08    0.60    0.47    0.39
   5  2  2  0  1.17   25.0    0.17    1.27    0.99    0.83
   5  3  2  0  1.84   25.0    0.09    2.13    1.67    1.38
   5  4  2  0  2.41   25.1    0.13    2.98    2.32    1.96
   6  1  1  0  0.60   14.9    0.10    0.37    0.29    0.18
   6  2  1  0  1.19   14.9    0.17    0.82    0.61    0.40
   6  3  1  0  1.83   14.9    0.15    1.35    1.03    0.62
   6  4  1  0  2.39   14.9    0.12    1.94    1.48    0.97
   6  1  2  0  0.59   25.1    0.08    0.61    0.49    0.37
   6  2  2  0  1.19   25.0    0.15    1.37    1.12    0.87
   6  3  2  0  1.77   25.1    0.16    2.21    1.79    1.37
   6  4  2  0  2.41    4.6    0.10    3.20    2.59    1.95
   6  1  3  0  0.61   34.9    0.09    0.38    0.29    0.22
   6  2  3  0  1.23   34.9    0.12    0.81    0.62    0.48
   6  3  3  0  1.83   35.0    0.09    1.25    0.95    0.71
   6  4  3  0  2.44   35.0    0.10    1.71    1.29    0.98
"Dynatest FWD"
   1  2  0  474  157  128  103   76   57    0    0
   1  4  0  967  317  266  214  165  123    0    0
   2  2  0  442  226  181  130   94   61    0    0
   2  4  0  959  464  376  280  202  136    0    0
   3  2  0  440  271  204  146   95   65    0    0
   3  4  0  946  533  413  299  205  142    0    0
   4  2  0  443  179  147  106   80   54    0    0
   4  4  0  955  377  309  234  173  123    0    0
   5  2  0  438  228  176  127   90   59    0    0
   5  4  0  946  469  369  227  197  134    0    0
   6  1  0  217  107   83   58   43   28    0    0
   6  2  0  431  216  169  119   83   57    0    0
   6  3  0  699  340  270  194  137   93    0    0
   6  4  0  940  458  368  268  192  131    0    0
"08-08-86"  1  1  1  1  0830  0900   80   80   81  71  75
"Dynaflect"
```

```
   1  0  1.0  8  0.47  0.37  0.27  0.19  0.13
   2  0  1.0  8  0.62  0.47  0.33  0.22  0.15
   3  0  1.0  8  0.63  0.48  0.33  0.22  0.14
   4  0  1.0  8  0.53  0.40  0.28  0.19  0.12
   5  0  1.0  8  0.62  0.47  0.33  0.22  0.14
   6  0  1.0  8  0.58  0.43  0.30  0.21  0.13
"Road Rater 400"
   1  1  2  0  0.61   25.1    0.48    0.38    0.29    0.22
   1  2  2  0  1.20   25.1    1.03    0.83    0.45    0.51
   1  3  2  0  1.30   25.0    1.75    1.41    1.30    0.90
   2  1  2  0  0.59   25.0    0.68    0.56    0.43    0.24
   2  2  2  0  1.22   25.0    1.53    1.30    1.00    0.67
   2  3  2  0  1.30   25.0    2.75    2.35    1.81    1.39
   3  1  2  0  0.60   25.0    0.81    1.06    0.45    0.37
   3  2  2  0  1.20   25.0    1.82    1.92    1.14    0.92
   3  3  2  0  1.81   25.0    3.57    3.94    2.34    1.77
   4  1  2  0  0.60   25.0    0.51    0.36    0.27    0.19
   4  2  2  0  1.20   25.0    1.10    0.84    0.61    0.46
   4  3  2  0  1.80   25.0    1.95    1.51    1.13    0.89
   5  1  2  0  0.60   25.0    0.64    0.50    0.38    0.29
   5  2  2  0  1.22   25.0    1.45    1.19    0.92    0.76
   5  3  2  0  1.79   25.0    2.51    1.98    1.57    1.22
   6  1  1  0  0.61   15.0    0.40    0.29    0.21    0.13
   6  2  1  0  1.21   15.0    0.91    0.66    0.47    0.32
   6  1  2  0  0.60   25.1    0.60    0.46    0.35    0.26
   6  2  2  0  1.21   25.1    1.32    1.06    0.80    0.63
   6  3  2  0  1.79   25.2    2.37    1.92    1.46    1.13
   6  1  3  0  0.59   35.1    0.43    0.33    0.26    0.18
   6  2  3  0  1.20   35.1    1.01    0.80    0.64    0.49
   6  3  3  0  1.81   35.1    2.22    1.82    1.42    1.22
   6  3  3  0  1.77   35.1    2.19    1.34    1.37    1.22
"Road Rater 2000"
   1  1  2  0  0.60   25.1    0.70    0.45    0.36    0.28
   1  2  2  0  1.23   25.1    1.55    0.98    0.79    0.60
   1  3  2  0  1.80   25.1    2.40    1.56    1.26    0.91
   1  4  2  0  2.41   25.0    3.48    2.23    1.79    1.28
   1  5  2  0  3.61   25.1    5.98    3.81    3.07    2.15
   2  1  2  0  0.56   25.1    0.70    0.54    0.46    0.54
   2  2  2  0  1.18   25.1    1.62    1.23    1.07    1.21
   2  3  2  0  1.77   25.0    2.68    2.06    1.75    2.09
   2  4  2  0  2.41   25.1    4.10    3.12    2.52    3.16
   2  5  2  0  3.59   25.1    7.22    5.55    4.37    4.32
   3  1  2  0  0.60   25.1    0.84    0.63    0.52    0.42
   3  2  2  0  1.22   25.1    1.90    1.47    1.12    0.96
   3  3  2  0  1.81   25.1    3.06    2.35    1.74    1.48
   3  4  2  0  2.40   25.1    4.48    3.48    2.64    2.21
   3  5  2  0  3.56   25.1    7.72    6.03    4.53    3.76
   4  1  2  0  0.58   25.1    0.67    0.43    0.36    0.24
   4  2  2  0  1.18   25.1    1.37    0.89    0.76    0.49
   4  3  2  0  1.81   25.1    2.17    1.42    1.20    0.78
   4  4  2  0  2.44   25.1    3.17    2.08    1.72    1.13
   4  5  2  0  3.57   25.1    5.15    3.40    2.69    1.91
   5  1  2  0  0.58   25.1    0.67    0.50    0.40    0.32
   5  2  2  0  1.20   25.1    1.53    1.14    0.92    0.70
   5  3  2  0  1.81   25.1    2.49    1.82    1.47    1.12
   5  4  2  0  2.41   25.1    3.62    2.61    2.08    1.57
   5  5  2  0  3.58   25.1    6.22    4.51    3.55    2.65
   6  1  1  0  0.61   15.2    0.47    0.31    0.24    0.17
   6  2  1  0  1.18   15.1    1.11    0.70    0.51    0.37
   6  3  1  0  1.79   15.2    1.79    1.22    0.87    0.59
   6  4  1  0  2.38   15.2    2.68    1.81    1.21    0.85
   6  5  1  0  3.57   15.2    4.76    3.29    2.37    1.63
   6  1  2  0  0.60   25.1    0.68    0.50    0.39    0.31
   6  2  2  0  1.18   25.1    1.44    1.04    0.84    0.62
   6  3  2  0  1.82   25.1    2.49    1.77    1.40    1.06
   6  4  2  0  2.40   25.1    3.52    2.51    1.95    1.48
   6  5  2  0  3.60   25.0    6.02    4.26    3.27    2.42
   6  1  3  0  0.61   35.0    0.51    0.36    0.29    0.23
   6  2  3  0  1.20   35.1    1.07    0.75    0.61    0.47
   6  3  3  0  1.79   35.0    1.72    1.19    0.94    0.72
   6  4  3  0  2.41   35.1    2.42    1.66    1.29    0.99
   6  5  3  0  3.60   35.1    4.05    2.73    2.07    1.55
"Dynatest FWD"
   1  2  0  399  168  125   87   62   43   30   14
   1  4  0  840  369  276  202  143  102   71   37
   2  2  0  397  239  171  116   76   52    0    0
   2  4  0  844  510  375  257  178  120    0    0
   3  2  0  389  268  187  115   77   52   35   21
   3  4  0  837  554  397  260  173  116   79   44
   4  2  0  389  199  142   98   64   43    0    0
   4  4  0  844  440  323  228  154  103    0    0
   5  2  0  389  266  169  111   72   49   34   16
   5  4  0  825  560  372  254  167  112   73   27
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  388  254  161  104   72   47    0    0
   6  3  0  604  389  258  170  111   73    0    0
   6  4  0  827  532  354  241  162  102    0    0



"S10"  16  "SR"   46   2800  12.5    350  "S"
"F. Bartholomew/Decatur CL to 0.5m. w. of SR3"    6.50
"F. CR600W (1.1m. w. of SR3) westerly (WB)"    0.25
1  12086  79   7  1.6   0.00  10.0   0.0  14.4  "G"
"A-7-6"  16  "CL"      102.8  22.0   7  46.3  19.3  27.0  2.72
 70  2.8  0
2
"03-24-86"  1  0  1  1  1430  1500   78    0    0  62  35
"Dynaflect"
   1  0  1.0  8  0.81  0.59  0.39  0.26  0.14
   2  0  1.0  8  0.79  0.57  0.36  0.24  0.13
   3  0  1.0  8  0.71  0.51  0.33  0.22  0.11
   4  0  1.0  8  0.76  0.55  0.36  0.24  0.13
   5  0  1.0  8  0.80  0.57  0.37  0.24  0.13
   6  0  1.0  8  0.79  0.57  0.37  0.24  0.12
"Road Rater 2000"
   1  1  2  0  0.59   25.1    0.09    0.49    0.39    0.26
   1  2  2  0  1.20   25.0    0.13    1.06    0.73    0.53
   1  3  2  0  1.83   25.1    0.13    1.69    1.18    0.86
   1  4  2  0  2.42   25.1    0.12    2.39    1.69    1.23
   2  1  2  0  0.60   25.0    0.08    0.44    0.30    0.25
   2  2  2  0  1.19   25.1    0.17    0.98    0.64    0.52
   2  3  2  0  1.77   24.5    0.15    1.55    1.02    0.80
   2  4  2  0  2.39   25.1    0.11    2.20    1.46    1.11
   3  1  2  0  0.60   25.1    0.12    0.37    0.26    0.18
   3  2  2  0  1.21   25.1    0.17    0.75    0.52    0.35
   3  3  2  0  1.79   25.1    0.15    1.16    0.82    0.55
   3  4  2  0  2.39   25.1    0.11    1.63    1.12    0.75
   4  1  2  0  0.61   25.1    0.12    0.48    0.33    0.21
   4  2  2  0  1.17   25.1    0.15    1.04    0.70    0.44
   4  3  2  0  1.80   25.0    0.14    1.65    1.08    0.68
   4  4  2  0  2.39   25.1    0.13    2.41    1.58    0.96
   5  1  2  0  0.61   25.1    0.12    0.47    0.35    0.24
   5  2  2  0  1.19   25.1    0.15    0.97    0.71    0.50
   5  3  2  0  1.81   25.1    0.13    1.56    1.14    0.79
   5  4  2  0  2.41   25.1    0.14    2.20    1.58    1.08
   6  1  1  0  0.61   15.1    0.14    0.36    0.35    0.17
   6  1  1  0  0.58   19.2    0.09    0.42    0.29    0.20
   6  2  1  0  1.24   15.1    0.17    0.78    0.69    0.35
   6  3  1  0  1.80   15.1    0.16    1.28    1.09    0.53
   6  4  1  0  2.40   15.1    0.15    1.86    1.52    0.81
   6  1  2  0  0.60   25.1    0.11    0.46    0.31    0.22
   6  2  2  0  1.19   25.1    0.16    0.94    0.59    0.44
   6  3  2  0  1.84   25.1    0.11    1.54    0.97    0.71
   6  4  2  0  2.43   25.1    0.11    2.12    1.39    0.98
   6  1  3  0  0.61   35.1    0.11    0.58    0.45    0.34
   6  2  3  0  1.22   35.2    0.13    1.19    0.91    0.69
   6  3  3  0  1.81   33.2    0.13    1.83    1.38    1.03
   6  3  3  0  1.82   35.2    0.10    1.86    1.38    1.05
   6  4  3  0  2.43    35.1     0.12     2.55     1.88     1.41
"Dynatest FWD"
   1  2  0  458  259  196  109   79   44    0    0
   1  4  0  923  537  388  251  161  103    0    0
   2  2  0  425  233  158   97   60   41    0    0
   2  4  0  924  506  353  224  145   97    0    0
   3  2  0  429  221  146   91   58   37    0    0
   3  4  0  921  488  334  210  135   87    0    0
   4  2  0  432  230  157  102   62   43    0    0
   4  4  0  938  502  352  227  149   96    0    0
   5  2  0  421  247  170  105   69   42    0    0
   5  4  0  925  550  390  247  161  100    0    0
   6  1  0  213  118   78   46   29   15    0    0
   6  2  0  419  243  164  101   63   40    0    0
   6  3  0  658  389  267  167  103   64    0    0
   6  4  0  909  546  379  239  149   93    0    0
"08-08-86"  1  1  1  1  1124  1155   89   91   91  81  71
"Dynaflect"
   1  0  1.0  8  0.62  0.46  0.31  0.19  0.11
   2  0  1.0  8  0.80  0.58  0.37  0.22  0.12
   3  0  1.0  8  0.77  0.50  0.29  0.16  0.08
   4  0  1.0  8  0.78  0.57  0.36  0.23  0.11
   5  0  1.0  8  0.82  0.59  0.36  0.21  0.11
   6  0  1.0  3  0.86  0.61  0.36  0.21  0.11
"Road Rater 400"
   1  1  2  0  0.59    25.1     0.57     0.48     0.32     0.22
   1  2  2  0  1.22    25.1     1.41     1.21     0.86     0.59
   1  3  2  0  1.82    25.1     2.46     2.12     1.48     1.01
   2  1  2  0  0.61    25.1     0.76     0.60     0.42     0.55
   2  2  2  0  1.20    25.1     1.75     1.47     1.03     2.35
   2  3  2  0  1.79    25.1     3.19     2.64     1.79     5.56
   3  1  2  0  0.60    25.1     0.65     0.46     0.27     0.72
   3  2  2  0  1.21    25.1     1.60     1.11     0.70     0.72
   3  3  2  0  1.82    25.1     3.08     1.87     1.38     0.80
   4  1  2  0  0.60    25.1     0.73     0.55     0.37     0.23
   4  2  2  0  1.22    25.1     1.81     1.46     0.95     0.66
   4  3  2  0  1.79    25.1     3.73     2.99     1.39     1.23
   5  1  2  0  0.59    25.1     0.74     0.56     0.34     0.22
   5  2  2  0  1.20    25.1     1.86     1.41     1.79     0.59
   5  3  2  0  1.81    25.1     3.85     3.35     4.75     1.18
   6  1  1  0  0.59    15.0     0.58     0.45     0.27     0.16
   6  2  1  0  1.19    15.1     1.54     1.18     0.73     0.43
   6  1  2  0  0.60    25.1     0.75     0.57     0.36     0.21
   6  2  2  0  1.20    25.1     1.97     1.43     0.89     0.56
   6  3  2  0  1.79    25.1     3.90     3.80     5.15     1.07
   6  1  3  0  0.59    34.9     1.09     0.94     1.21     0.51
   6  2  3  0  1.19    34.9     3.66     3.24     2.57     1.59
   6  3  3  0  1.80    35.0     5.59     5.50    13.78     2.52
"Road Rater 2000"
   1  1  2  0  0.59    25.1     0.75     0.43     0.30     0.22
   1  2  2  0  1.24    25.1     1.70     0.96     0.64     0.47
   1  3  2  0  1.76    25.1     2.58     1.49     1.00     0.70
   1  4  2  0  2.43    25.1     3.70     2.17     1.41     1.00
   1  5  2  0  3.56    25.1     6.15     3.56     2.39     1.57
   2  1  2  0  0.57    25.1     0.89     0.55     0.35     0.29
   2  2  2  0  1.20    25.1     2.01     1.28     0.88     0.63
   2  3  2  0  1.78    25.2     3.08     2.04     1.33     0.98
   2  4  2  0  2.39    25.1     4.32     2.87     1.93     1.36
   2  5  2  0  3.59    25.1     7.33     4.70     3.15     2.24
   3  1  2  0  0.63    25.1     0.72     0.45     0.27     0.18
   3  2  2  0  1.24    25.1     1.49     0.97     0.54     0.38
   3  3  2  0  1.81    25.1     2.37     1.55     0.85     0.58
   3  4  2  0  2.41    25.1     3.43     2.22     1.25     0.79
   3  5  2  0  3.59    25.1     6.04     3.81     2.14     1.30
   4  1  2  0  0.60    25.2     0.87     0.51     0.33     0.27
   4  2  2  0  1.22    25.1     1.88     1.14     0.71     0.56
   4  3  2  0  1.83    25.1     3.05     1.90     1.13     0.87
   4  4  2  0  2.41    25.1     4.37     2.76     1.68     1.22
   4  5  2  0  3.60    25.1     6.88     4.77     2.87     1.99
   5  1  2  0  0.59    25.1     0.80     0.50     0.32     0.24
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    5  2  2  0  1.24   25.1    1.84    1.14    0.73    0.50
    5  3  2  0  1.79   25.2    2.79    1.76    1.13    0.78
    5  4  2  0  2.40   25.1    4.01    2.55    1.64    1.11
    5  5  2  0  3.59   25.1    6.92    4.48    2.80    1.81
    6  1  1  0  0.60   15.2    0.69    0.42    0.28    0.17
    6  2  1  0  1.21   15.2    1.49    0.97    0.63    0.37
    6  3  1  0  1.77   15.2    2.51    1.66    0.99    0.60
    6  4  1  0  2.37   15.2    3.93    2.52    1.54    0.93
    6  5  1  0  3.58   15.1    7.22    5.08    3.20    1.97
    6  1  2  0  0.63   25.1    0.87    0.59    0.41    0.28
    6  2  2  0  1.20   25.1    1.87    1.27    0.86    0.55
    6  3  2  0  1.81   25.1    3.02    2.07    1.36    0.87
    6  4  2  0  2.44   25.1    4.50    3.07    1.98    1.22
    6  5  2  0  3.57   25.1    7.67    5.19    3.26    1.98
    6  1  3  0  0.62   35.1    1.10    0.78    0.65    0.53
    6  2  3  0  1.19   35.0    2.12    1.60    1.27    1.02
    6  3  3  0  1.79   35.0    3.31    2.46    1.89    1.52
    6  4  3  0  2.41   35.1    4.80    3.45    2.59    2.03
    6  5  3  0  3.63   35.1    8.41    5.55    3.96    2.99
"Dynatest FWD"
    1  2  0  388  247  172  105   63   38   26   14
    1  4  0  851  557  405  253  151   92   61   34
    2  2  0  392  315  211  116   73   40    0    0
    2  4  0  832  694  482  285  170   99    0    0
    3  2  0  383  405  209  102   59   33   20   06
    3  4  0  816  848  494  254  142   80   54   47
    4  2  0  385  331  224  127   72   43    0    0
    4  4  0  837  725  514  309  176  105    0    0
    5  2  0  386  358  238  132   70   42   22   16
    5  4  0  825  768  539  316  173   99   58   35
    6  1  0    0    0    0    0    0    0    0    0
    6  2  0  380  364  236  129   69   41    0    0
    6  3  0  599  559  377  213  121   68    0    0
    6  4  0  821  755  520  301  170   96    0    0



"S11"  69  "US"   50   4080  10.0    408  "S"
"F. e. Versailles C/L to SR129"    2.35
"F. 0.7m. e. of US421 easterly to State Park entrance (WB)"    0.25
1  11227  78   8  2.1   0.00   5.9   0.0   6.0  "G"
"A-7-6"  20  "CH"     102.6  22.8   5  58.6  20.0  38.6  2.75
 80  3.2  0
2
"03-24-86"  1  1  1  1  1020  1350   62   90    0  40  48
"Dynaflect"
   1  0  1.0  8  0.25  0.19  0.21  0.15  0.10
   2  0  1.0  8  0.28  0.21  0.24  0.17  0.11
   3  0  1.0  8  0.31  0.25  0.29  0.21  0.13
   4  0  1.0  8  0.37  0.30  0.35  0.24  0.15
   5  0  1.0  8  0.44  0.37  0.42  0.29  0.19
   6  0  1.0  8  0.51  0.42  0.46  0.31  0.22
"Road Rater 400"
   1  1  2  0  0.59   24.9    0.21    0.10    0.15    0.11
   1  2  2  0  1.19   25.0    0.42    0.95    0.93    0.42
   1  3  2  0  1.86   25.0    0.89    1.18    0.71    0.75
   2  1  2  0  0.62   25.0    0.25    0.16    0.19    0.10
   2  2  2  0  1.24   25.0    0.54    1.21    0.43    0.55
   2  3  2  0  1.80   25.0    1.13    1.08    0.97    2.51
   3  1  2  0  0.61   24.9    0.26    0.22    0.19    0.15
   3  2  2  0  1.22   25.0    0.52    0.24    1.48    0.38
   3  3  2  0  1.79   25.0    2.49    0.99    1.03    0.75
   4  1  2  0  0.61   25.0    0.28    0.26    0.20    0.47
   4  2  2  0  1.21   25.0    0.60    1.13    0.48    1.27
   4  3  2  0  1.78   25.0    1.20    2.39    1.03    2.59
   5  1  2  0  0.59   24.9    0.21    0.18    0.16    0.40
   5  2  2  0  1.22   25.0    0.50    0.44    0.44    0.94
   5  3  2  0  1.82   25.0    1.03    0.91    0.83    2.98
   6  1  1  0  0.63   15.3    0.36    0.34    1.71    2.53
   6  2  1  0  1.22   15.3    0.77    0.77    0.64    0.61
   6  1  2  0  0.61   25.0    2.49    0.20    0.21    1.17
   6  2  2  0  1.22   25.0    0.56    0.79    0.45  - 0.99
   6  3  2  0  1.31   25.0    1.13    2.78    1.03   10.73
   6  1  3  0  0.59   35.4    0.23    0.57    0.14    0.50
   6  2  3  0  1.24   35.4    0.51    1.50    0.38    0.41
   6  3  3  0  1.77   35.4    1.45    2.16    1.20    7.65
"Road Rater 2000"
   1  1  2  0  0.59   25.0    0.07    0.17    0.16    0.16
   1  2  2  0  1.22   25.0    0.11    0.36    0.29    0.28
   1  3  2  0  1.80   25.0    0.12    0.52    0.43    0.42
   1  4  2  0  2.39   25.0    0.10    0.70    0.58    0.55
   2  1  2  0  0.57   25.0    0.07    0.21    0.21    0.18
   2  2  2  0  1.15   25.0    0.15    0.43    0.39    0.35
   2  3  2  0  1.83   25.0    0.08    0.68    0.60    0.55
   2  4  2  0  2.38   25.0    0.08    0.88    0.79    0.73
   3  1  2  0  0.59   25.0    0.07    0.21    0.21    0.18
   3  2  2  0  1.21   25.1    0.16    0.45    0.42    0.37
   3  3  2  0  1.81   25.0    0.11    0.67    0.63    0.55
   3  4  2  0  2.39   25.0    0.09    0.89    0.83    0.72
   4  1  2  0  0.59   25.1    0.09    0.23    0.21    0.19
   4  2  2  0  1.19   25.0    0.13    0.48    0.44    0.38
   4  3  2  0  1.80   25.0    0.11    0.73    0.67    0.57
   4  4  2  0  2.42   25.0    0.09    0.96    0.90    0.77
   5  1  2  0  0.60   25.0    0.07    0.20    0.20    0.16
   5  2  2  0  1.18   25.0    0.14    0.41    0.37    0.31
   5  3  2  0  1.82   25.0    0.09    0.61    0.56    0.48
   5  4  2  0  2.40   25.0    0.10    0.81    0.72    0.64
   6  1  1  0  0.58   15.1    0.12    0.27    0.25    0.20
   6  2  1  0  1.21   15.1    0.18    0.57    0.50    0.43
   6  3  1  0  1.80   15.1    0.16    0.86    0.80    0.64
   6  4  1  0  2.43   15.1    0.18    1.18    1.06    0.90
   6  1  2  0  0.62   25.0    0.07    0.23    0.20    0.17
   6  2  2  0  1.21   25.0    0.13    0.48    0.40    0.32
   6  3  2  0  1.82   25.0    0.08    0.71    0.59    0.48
   6  4  2  0  2.40   25.0    0.08    0.95    0.80    0.64
   6  1  3  0  0.62   35.1    0.11    0.21    0.19    0.14
   6  2  3  0  1.25   35.1    0.13    0.40    0.35    0.26
   6  3  3  0  1.81   35.1    0.12    0.58    0.51    0.39
   6  4  3  0  2.42   35.1    0.13    0.79    0.70    0.54
"Dynatest FWD"
   1  2  0  447   56   46   38   32   24    0    0
   1  4  0  964  117   96   82   69   55    0    0
   2  2  0  463   60   49   41   33   29    0    0
   2  4  0  976  127   99   86   74   60    0    0
   3  2  0  454   63   52   45   37   30    0    0
   3  4  0  969  129  108   95   81   67    0    0
   4  2  0  446   82   61   53   40   34    0    0
   4  4  0  943  167  130  113   92   75    0    0
   5  2  0  439   74   57   51   39   34    0    0
   5  4  0  941  154  123  112   92   72    0    0
   6  1  0  223   46   34   29   22   18    0    0
   6  2  0  446   91   70   60   45   37    0    0
   6  3  0  686  140  108   95   76   59    0    0
   6  4  0  938  191  149  130  105   83    0    0
"08-08-86"  1  1  1  1  1010  1035   95   93    0  77  76
"Dynaflect"
   1  0  1.0  8  0.24  0.21  0.19  0.15  0.10
   2  0  1.0  8  0.26  0.22  0.20  0.15  0.11
   3  0  1.0  8  0.28  0.25  0.22  0.18  0.14
   4  0  1.0  8  0.32  0.27  0.24  0.19  0.14
   5  0  1.0  8  0.32  0.28  0.25  0.20  0.15
   6  0  1.0  8  0.41  0.37  0.32  0.26  0.19
"Road Rater 400"
   1  1  2  0  0.61   25.1    0.25    0.17    0.18    0.14
   1  2  2  0  1.21   25.2    0.54    0.45    0.39    2.04
   1  3  2  0  1.79   25.2    0.86    0.76    0.68    2.07
   2  1  2  0  0.61   25.1    0.29    0.24    0.21    0.18
   2  2  2  0  1.18   25.0    0.62    0.54    0.48    0.43
   2  3  2  0  1.81   25.0    1.01    0.93    0.83    0.73
   3  1  2  0  0.59   25.0    0.28     0.22     0.22     0.19
   3  2  2  0  1.21   25.1    0.64     0.61     0.50     0.42
   3  3  2  0  1.80   25.1    0.95     1.07     0.84     0.76
   4  1  2  0  0.59   25.0    0.29     0.23     0.20     1.39
   4  2  2  0  1.21   25.1    0.67     0.57     0.49     1.85
   4  3  2  0  1.82   25.1    1.05     0.93     2.38     0.75
   5  1  2  0  0.59   25.0    0.28     0.22     0.20     0.16
   5  2  2  0  1.20   25.1    0.62     0.52     0.48     0.40
   5  3  2  0  1.81   25.1    0.98     0.85     0.76     1.67
   6  1  1  0  0.60   15.1    0.32     0.28     0.25     0.91
   6  2  1  0  1.20   15.2    0.75     0.65     0.61     1.06
   6  1  2  0  0.60   25.0    0.29     0.25     0.21     0.16
   6  2  2  0  1.21   25.1    0.66     0.57     0.50     0.22
   6  3  2  0  1.80   25.1    1.02     0.90     0.79     0.61
   6  1  3  0  0.59   35.0    0.24     0.19     0.26     0.41
   6  2  3  0  1.19   35.0    0.63     0.53     0.64     1.32
   6  3  3  0  1.81   35.0    1.19     1.04     0.89     0.75
"Road Rater 2000"
   1  1  2  0  0.62   25.1    0.28     0.21     0.19     0.17
   1  2  2  0  1.20   25.2    0.57     0.43     0.38     0.32
   1  3  2  0  1.81   25.2    0.89     0.65     0.58     0.49
   1  4  2  0  2.44   25.1    1.24     0.91     0.83     0.69
   1  5  2  0  3.60   25.1    1.82     1.38     1.26     1.08
   2  1  2  0  0.59   25.1    0.30     0.24     0.17     0.20
   2  2  2  0  1.23   25.1    0.64     0.53     0.31     0.41
   2  3  2  0  1.76   25.2    0.91     0.76     0.48     0.60
   2  4  2  0  2.44   25.1    1.29     1.06     0.71     0.84
   2  5  2  0  3.59   25.1    1.93     1.60     1.22     1.26
   3  1  2  0  0.57   25.1    0.32     0.25     0.23     0.19
   3  2  2  0  1.21   25.1    0.69     0.53     0.49     0.42
   3  3  2  0  1.84   25.2    1.05     0.79     0.73     0.62
   3  4  2  0  2.42   25.1    1.39     1.05     0.98     0.84
   3  5  2  0  3.57   25.2    2.02     1.56     1.46     1.24
   4  1  2  0  0.62   25.2    0.39     0.27     0.26     0.21
   4  2  2  0  1.23   25.2    0.76     0.54     0.49     0.40
   4  3  2  0  1.81   25.1    1.13     0.79     0.72     0.61
   4  4  2  0  2.42   25.1    1.49     1.03     0.95     0.79
   4  5  2  0  3.58   25.1    2.21     1.56     1.43     1.19
   5  1  2  0  0.58   25.1    0.30     0.30     0.19     0.17
   5  2  2  0  1.21   25.1    0.62     0.61     0.41     0.35
   5  3  2  0  1.80   25.1    0.88     0.88     0.59     0.50
   5  4  2  0  2.43   25.2    1.17     1.17     0.82     0.68
   5  5  2  0  3.63   25.1    1.83     1.68     1.21     1.03
   6  1  1  0  0.62   15.2    0.40     0.30     0.27     0.22
   6  2  1  0  1.21   15.2    0.74     0.57     0.52     0.41
   6  3  1  0  1.76   15.2    1.13     0.86     0.75     0.62
   6  4  1  0  2.40   15.2    1.52     1.19     1.07     0.85
   6  5  1  0  3.58   15.2    2.76     1.92     1.69     1.35
   6  1  2  0  0.64   25.0    0.35     0.22     0.19     0.16
   6  2  2  0  1.21   25.1    0.67     0.44     0.39     0.31
   6  3  2  0  1.83   25.0    1.03     0.68     0.60     0.49
   6  4  2  0  2.43   25.1    1.38     0.92     0.80     0.65
   6  5  2  0  3.62   25.1    2.09     1.41     1.23     1.00
   6  1  3  0  0.62   35.2    0.32     0.21     0.18     0.15
   6  2  3  0  1.22   35.2    0.64     0.40     0.34     0.26
   6  3  3  0  1.82   35.2    0.99     0.61     0.52     0.40
   6  4  3  0  2.43   35.2    1.32     0.83     0.70     0.53
   6  5  3  0  3.64   35.2    2.06     1.30     1.10     0.85
"Dynatest FWD"
   1  2  0  394    72    51    43    35    31    23    13
   1  4  0  838   153   110    98    78    66    52    29
   2  2  0  392    87    51    45    37    29     0     0
   2  4  0  844   170   109    95    78    64     0     0
   3  2  0  392    74    54    47    41    33    27    14
   3  4  0  846   156   115   101    85    71    57    32
   4  2  0  390    88    57    51    40    31     0     0
   4  4  0  843   181   127   109    89    68     0     0
   5  2  0  390   104    57    50    44    33    27    15
   5  4  0  842   204   122   108    92    72    58    35
   6  1  0    0     0     0     0     0     0     0     0
   6  2  0  381  108   66   64   51   41    0    0
   6  3  0  615  170  111  100   81   63    0    0
   6  4  0  839  233  151  136  110   86    0    0



"S12"  10  "SR"   60   5420  11.5    623  "S"
"F. e. Borden C/L easterly"    1.73
"F. 4.8m. e. of SR335 (at Scenic Valley Apts.) easterly (EB)"    0.25
1  12341  80   6  2.4   0.00  10.8   0.0   7.6  "G"
"A-6"     8  "CL"     111.7  18.9  12  31.7  20.8  10.9  2.73
 91  3.6  0
3
"03-21-86"  1  1  1  0  1050  1120   37    0    0  30  50
"Dynaflect"
   1  0  1.0  8  0.53  0.42  0.35  0.32  0.22
   2  0  1.0  8  0.57  0.45  0.36  0.31  0.22
   3  0  1.0  8  0.51  0.40  0.32  0.28  0.17
   4  0  1.0  8  0.50  0.39  0.31  0.27  0.16
   5  0  1.0  8  0.46  0.35  0.28  0.25  0.17
   6  0  1.0  8  0.49  0.37  0.28  0.25  0.16
"Road Rater 400"
   1  1  2  0  0.59   25.0    0.24    0.20    0.54    0.10
   1  2  2  0  1.23   25.1    0.58    0.50    1.23    0.30
   1  3  2  0  1.77   25.1    1.14    1.71    3.67    0.65
   2  1  2  0  0.60   25.0    0.28    0.18    0.38    0.80
   2  2  2  0  1.22   25.1    0.62    0.45    0.38    2.34
   2  3  2  0  1.82   25.1    1.20    1.97    0.89    3.02
   3  1  2  0  0.61   25.1    0.25    0.21    0.60    0.15
   3  2  2  0  1.21   25.1    0.55    0.55    0.88    0.51
   3  3  2  0  1.86   25.1    1.20    0.85    3.14    3.66
   4  1  2  0  0.58   25.0    0.27    0.22    0.17    0.33
   4  2  2  0  1.22   25.1    0.63    0.81    0.41    0.53
   4  3  2  0  1.84   25.1    1.20    1.02    0.82    2.44
   5  1  2  0  0.59   25.0    0.26    0.26    0.69    0.25
   5  2  2  0  1.23   25.1    0.61    1.86    0.39    3.58
   5  3  2  0  1.81   25.1    1.20    1.03    2.88    3.66
   6  1  1  0  0.62   15.0    0.38    0.27    0.12    0.45
   6  2  1  0  1.22   15.1    0.88    0.69    0.78    1.70
   6  1  2  0  0.68   25.2    0.30    0.21    0.53    0.14
   6  2  2  0  1.23   25.2    0.64    0.74    0.37    0.24
   6  3  2  0  1.86   25.2    1.39    1.66    4.87    6.00
   6  1  3  0  0.59   34.8    0.23    0.14    0.28    0.22
   6  2  3  0  1.18   34.8    0.48    0.36    0.44    0.35
   6  2  3  0  1.34   34.8    1.78    1.18    3.65    3.13
"Road Rater 2000"
   1  1  2  0  0.65   25.0    0.07    0.24    0.21    0.17
   1  2  2  0  1.22   25.1    0.15    0.47    0.40    0.32
   1  3  2  0  1.81   25.0    0.10    0.71    0.60    0.49
   1  4  2  0  2.42   25.0    0.11    0.97    0.82    0.67
   2  1  2  0  0.56   25.0    0.06    0.20    0.16    0.13
   2  2  2  0  1.83   25.1    0.14    0.67    0.54    0.41
   2  3  2  0  1.16   25.0    0.14    0.43    0.34    0.26
   2  4  2  0  2.39   25.0    0.09    0.90    0.73    0.56
   3  1  2  0  0.57   25.0    0.09    0.18    0.15    0.13
   3  2  2  0  1.21   25.0    0.14    0.41    0.32    0.25
   3  3  2  0  1.84   25.0    0.10    0.62    0.49    0.38
   3  4  2  0  2.40   25.1    0.14    0.83    0.67    0.51
   4  1  2  0  0.59   25.1    0.09    0.21    0.16    0.13
   4  2  2  0  1.21   25.0    0.12    0.44    0.36    0.27
   4  3  2  0  1.80   25.0    0.10    0.66    0.54    0.41
   4  4  2  0  2.38   25.0    0.09    0.90    0.73    0.55
   5  1  2  0  0.59   25.1    0.08    0.19    0.16    0.13
   5  2  2  0  1.16   25.0    0.15    0.42    0.33    0.25
   5  3  2  0  1.78   25.0    0.12    0.64    0.52    0.40
   5  4  2  0  2.41   25.0    0.11    0.89    0.72    0.54
   6  1  1  0  0.60   15.0    0.09    0.30    0.30    0.22
   6  2  1  0  1.20   15.0    0.14    0.59    0.63    0.45
   6  3  1  0  1.77   15.0    0.15    0.90    0.96    0.70
   6  4  1  0  2.39   15.0    0.10    1.31    1.38    0.95
   6  1  2  0  0.58   25.1    0.08    0.19    0.26    0.15
   6  2  2  0  1.22   25.1    0.14    0.42    0.54    0.28
   6  3  2  0  1.84   25.1    0.12    0.63    0.86    0.43
   6  4  2  0  2.42   25.0    0.11    0.86    1.18    0.59
   6  1  3  0  0.63   35.0    0.07    0.17    0.22    0.13
   6  2  3  0  1.26   24.4    0.11    0.36    0.42    0.20
   6  3  3  0  1.81   35.0    0.12    0.54    0.60    0.29
   6  4  3  0  2.41   35.1    0.12    0.74    0.74    0.44
"04-23-86"  0  0  0  1  1450  1520   77    0    0  61  52
"Dynatest FWD"
   1  2  0  404  182  136   97   74   55    0    0
   1  4  0  871  383  295  220  168  126    0    0
   2  2  0  400  223  146   99   68   49    0    0
   2  4  0  867  465  328  229  160  114    0    0
   3  2  0  400  168  118   81   58   42    0    0
   3  4  0  868  357  260  186  132   96    0    0
   4  2  0  399  155  101   73   54   38    0    0
   4  4  0  865  329  234  173  128   91    0    0
   5  2  0  398  134   97   70   50   35   26   13
   5  4  0  863  296  227  168  123   86   61   30
   6  1  0  181   58   35   25   17   12    0    0
   6  2  0  400  152  101   73   49   34    0    0
   6  3  0  631  241  169  124   84   58    0    0
   6  4  0  863  324  236  174  120   83    0    0
"08-07-86"  1  1  1  1  1200  1235  106  106  106  82  72
"Dynaflect"
   1  0  1.0  8  0.53  0.44  0.33  0.25  0.19
   2  0  1.0  8  0.59  0.47  0.34  0.25  0.18
   3  0  1.0  8  0.49  0.40  0.30  0.23  0.17
   4  0  1.0  8  0.49  0.39  0.29  0.20  0.14
   5  0  1.0  8  0.41  0.34  0.26  0.18  0.12
   6  0  1.0  8  0.43  0.34  0.25  0.18  0.12
"Road Rater 400"
   1  1  2  0  0.59   24.9    0.42    0.35    0.23    0.17
   1  2  2  0  1.18   24.9    0.92    1.17    0.50    0.69
   1  3  2  0  1.79   25.0    1.61    1.26    0.93    1.72
   2  1  2  0  0.60   25.0    0.45    0.28    0.34    0.12
   2  2  2  0  1.22   25.0    0.92    0.61    1.62    0.30
   2  3  2  0  1.81   25.0    1.57    2.23    1.37    0.51
   3  1  2  0  0.59   25.0    0.35    0.22    0.14    0.11
   3  2  2  0  1.21   25.0    0.75    0.89    0.34    0.40
   3  3  2  0  1.79   25.0    1.27    1.53    1.25    0.46
   4  1  2  0  0.59   25.0    0.42    0.27    0.20    0.22
   4  2  2  0  1.21   25.0    0.87    0.73    0.41    0.26
   4  3  2  0  1.81   25.0    1.51    1.08    0.73    0.50
   5  1  2  0  0.60   25.0    0.35    0.22    0.16    0.12
   5  2  2  0  1.20   25.0    0.71    0.75    0.35    0.19
   5  3  2  0  1.80   25.0    1.18    1.19    0.63    0.77
   6  1  1  0  0.60   15.0    0.41    0.32    0.25    0.37
   6  2  1  0  1.21   15.0    0.87    0.66    0.53    0.58
   6  1  2  0  0.61   25.1    0.35    0.24    0.17    0.17
   6  2  2  0  1.21   25.2    0.73    0.52    0.36    0.40
   6  3  2  0  1.81   25.1    1.21    0.89    0.61    0.42
   6  1  3  0  0.59   34.9    0.27    0.20    0.11    0.16
   6  2  3  0  1.19   35.0    0.64    0.53    0.30    0.39
   6  3  3  0  1.81   35.0    1.36    0.98    0.67    0.54
"Road Rater 2000"
   1  1  2  0  0.61   25.2    0.50    0.29    0.27    0.19
   1  2  2  0  1.23   25.2    1.08    0.66    0.58    0.40
   1  3  2  0  1.82   25.2    1.68    1.02    0.92    0.61
   1  4  2  0  2.40   25.3    2.33    1.39    1.25    0.83
   1  5  2  0  3.58   25.2    3.93    2.32    1.97    1.34
   2  1  2  0  0.60   25.2    0.50    0.26    0.19    0.15
   2  2  2  0  1.16   25.2    1.01    0.56    0.39    0.29
   2  3  2  0  1.82   25.2    1.69    0.91    0.62    0.43
   2  4  2  0  2.42   25.2    2.43    1.32    0.90    0.64
   2  5  2  0  3.61   25.2    4.09    2.21    1.51    1.03
   3  1  2  0  0.60   25.2    0.41    0.23    0.17    0.14
   3  2  2  0  1.24   25.2    0.85    0.46    0.34    0.26
   3  3  2  0  1.84   25.2    1.30    0.73    0.53    0.39
   3  4  2  0  2.43   25.2    1.83    1.03    0.74    0.54
   3  5  2  0  3.59   25.2    3.11    1.70    1.22    0.87
   4  1  2  0  0.60   25.2    0.38    0.25    0.18    0.13
   4  2  2  0  1.20   25.2    0.81    0.50    0.38    0.26
   4  3  2  0  1.81   25.2    1.24    0.79    0.58    0.41
   4  4  2  0  2.42   25.2    1.77    1.11    0.81    0.57
   4  5  2  0  3.58   25.2    2.89    1.79    1.29    0.89
   5  1  2  0  0.61   25.2    0.36    0.21    0.15    0.14
   5  2  2  0  1.17   25.2    0.73    0.44    0.31    0.23
   5  3  2  0  1.81   25.2    1.19    0.71    0.51    0.37
   5  4  2  0  2.43   25.2    1.63    0.98    0.72    0.50
   5  5  2  0  3.65   25.2    2.79    1.65    1.23    0.83
   6  1  1  0  0.61   15.1    0.48    0.32    0.26    0.21
   6  2  1  0  1.24   15.1    0.96    0.64    0.53    0.43
   6  3  1  0  1.77   15.1    1.62    1.00    0.83    0.68
   6  4  1  0  2.42   15.1    2.28    1.54    1.18    0.92
   6  5  1  0  3.61   15.1    3.87    2.42    1.93    1.48
   6  1  2  0  0.63   25.2    0.37    0.21    0.17    0.14
   6  2  2  0  1.17   25.1    0.76    0.43    0.32    0.23
   6  3  2  0  1.83   25.2    1.25    0.72    0.51    0.36
   6  4  2  0  2.43   25.2    1.76    1.01    0.72    0.50
   6  5  2  0  3.61   25.2    3.01    1.72    1.23    0.85
   6  1  3  0  0.63   35.2    0.38    0.20    0.15    0.12
   6  2  3  0  1.23   35.2    0.76    0.40    0.29    0.20
   6  3  3  0  1.82   35.2    1.22    0.64    0.46    0.32
   6  4  3  0  2.37   35.2    1.74    0.90    0.65    0.44
   6  5  3  0  3.62   35.2    3.02    1.54    1.09    0.74
"Dynatest FWD"
   1  2  0  390  183  121   85   63   47   36   23
   1  4  0  830  402  281  199  147  108   79   52
   2  2  0  386  211  138   84   56   42    0    0
   2  4  0  828  467  315  203  136   97    0    0
   3  2  0  386  169  108   72   50   36   30   20
   3  4  0  825  370  246  170  117   83   66   44
   4  2  0  380  180  107   73   46   33    0    0
   4  4  0  819  389  255  173  115   81    0    0
   5  2  0  382  138   97   66   44   30   22   15
   5  4  0  819  312  231  163  112   76   53   29
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  378  148   96   67   44   31    0    0
   6  3  0  593  242  166  113   75   52    0    0
   6  4  0  815  340  233  164  108   75    0    0



"S13"   3  "SR"   46   7830   8.0    626  "S"
"F. e. Columbus City C/L to SR9"    4.81
"F. 3.4m. w. of SR9 westerly to near county market (WB)"    0.25
1  10666  76  10  1.0   0.00  11.0   0.0   5.0  "6"
"A-2-6"   1  "SC"     108.6  18.4  18  31.0  19.5  11.5  2.68
 68  3.0  0
2
"03-24-86"  1  0  1  1  1715  1745   72    0    0  62  35
"Dynaflect"
   1  0  1.0  8  1.09  0.76  0.49  0.34  0.21
   2  0  1.0  8  0.91  0.68  0.46  0.32  0.20
   3  0  1.0  8  0.93  0.64  0.39  0.27  0.16
   4  0  1.0  8  0.99  0.67  0.38  0.24  0.13
   5  0  1.0  8  1.03  0.76  0.47  0.31  0.18
   6  0  1.0  8  1.13  0.80  0.48  0.31  0.16
"Road Rater 2000"
   1  1  2  0  0.62   25.1    0.11    0.51    0.35    0.24
   1  2  2  0  1.22   25.1    0.14    1.06    0.74    0.50
   1  3  2  0  1.80   25.1    0.13    1.67    1.13    0.79
   1  4  2  0  2.39   25.1    0.11    2.36    1.62    1.10
   2  1  2  0  0.61   25.1    0.12    0.40    0.27    0.18
   2  2  2  0  1.15   25.0    0.14    0.81    0.57    0.38
   2  3  2  0  1.78   25.1    0.15    1.29    0.91    0.59
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    2  4  2  0  2.39   25.1    0.11    1.30    1.27    0.82
    3  1  2  0  0.59   25.1    0.10    0.48    0.36    0.19
    3  2  2  0  1.20   25.1    0.15    1.05    0.88    0.41
    3  3  2  0  1.85   25.1    0.12    1.75    1.66    0.68
    3  4  2  0  2.44   25.1    0.13    2.39    2.36    0.92
    4  1  2  0  0.58   25.1    0.08    0.46    0.40    0.20
    4  2  2  0  1.20   25.1    0.17    1.00    0.70    0.44
    4  3  2  0  1.80   25.1    0.12    1.68    1.06    0.72
    4  4  2  0  2.43   25.1    0.13    2.46    1.50    1.03
    5  1  2  0  0.59   25.1    0.10    0.43    0.27    0.21
    5  2  2  0  1.19   25.1    0.15    0.90    0.57    0.41
    5  3  2  0  1.77   25.1    0.14    1.45    0.92    0.64
    5  4  2  0  2.39   25.1    0.11    2.03    1.29    0.88
    6  1  1  0  0.61   15.1    0.12    0.50    0.42    0.26
    6  2  1  0  1.24   15.1    0.19    1.14    0.87    0.54
    6  3  1  0  1.79   15.1    0.17    1.75    1.41    0.86
    6  4  1  0  2.40   15.1    0.15    2.60    2.06    1.24
    6  1  2  0  0.58   25.1    0.08    0.49    0.29    0.23
    6  2  2  0  1.23   25.2    0.15    1.11    0.71    0.55
    6  3  2  0  1.81   25.2    0.14    1.76    1.11    0.84
    6  4  2  0  2.38   25.1    0.11    2.40    1.59    1.17
    6  1  3  0  0.61   35.1    0.10    0.47    0.29    0.23
    6  2  3  0  1.22   35.1    0.14    0.95    0.61    0.44
    6  3  3  0  1.78   35.0    0.13    1.46    0.93    0.67
    6  4  3  0  2.41   35.0    0.12    2.05    1.30    0.91
"Dynatest FWD"
    1  2  0  428  335  227  130   79   52    0    0
    1  4  0  917  713  493  287  173  113    0    0
    2  2  0  432  244  174  113   68   46    0    0
    2  4  0  919  530  385  245  153  101    0    0
    3  2  0  427  342  215  118   69   43    0    0
    3  4  0  903  675  445  253  149   98    0    0
    4  2  0  420  363  224  116   63   40    0    0
    4  4  0  916  758  487  259  145   90    0    0
    5  2  0  425  302  209  126   83   55    0    0
    5  4  0  921  637  447  288  185  126    0    0
    6  1  0  218  167  113   61   36   23    0    0
    6  2  0  421  339  229  128   75   49    0    0
    6  3  0  656  531  365  203  120   77    0    0
    6  4  0  921  737  513  277  173  105    0    0
"08-08-86"  1  1  1  1  1400  1430  112  108    0  87  72
"Dynaflect"
    1  0  1.0  8  0.81  0.59  0.38  0.25  0.17
    2  0  1.0  8  0.79  0.58  0.38  0.25  0.17
    3  0  1.0  8  0.70  0.50  0.32  0.21  0.13
    4  0  1.0  8  0.74  0.52  0.31  0.18  0.11
    5  0  1.0  8  0.82  0.58  0.35  0.24  0.15
    6  0  1.0  8  0.90  0.62  0.37  0.22  0.14
"Road Rater 400"
    1  1  2  0  0.58   25.2    0.63    0.90    0.32    0.26
    1  2  2  0  1.20   25.1    1.60    1.79    1.05    0.75
    1  3  2  0  1.81   25.1    2.66    2.51    1.70    1.22
    2  1  2  0  0.60   25.0    0.76    0.50    0.31    0.06
    2  2  2  0  1.21   25.0    1.79    1.25    0.75    0.36
    2  3  2  0  1.79   25.1    3.14    2.66    1.98    0.86
    3  1  2  0  0.59   25.0    0.64    0.43    0.28    0.19
    3  2  2  0  1.22   25.1    1.56    1.18    0.51    0.46
    3  3  2  0  1.78   25.1    3.15    2.40    2.94    0.95
    4  1  2  0  0.59   25.0    0.77    0.52    0.32    0.26
    4  2  2  0  1.18   25.0    2.01    1.36    0.80    1.99
    4  3  2  0  1.79   25.1    3.93    2.79    1.55    1.89
    5  1  2  0  0.59   25.0    0.72    0.55    0.35    0.22
    5  2  2  0  1.21   25.0    2.26    1.77    1.10    0.71
    5  3  2  0  1.80   25.1    3.67    2.82    1.71    1.07
    6  1  1  0  0.62   15.2    0.81    0.69    0.38    0.23
    6  2  1  0  1.21   15.1    1.99    1.54    0.89    0.56
    6  1  2  0  0.60   25.1    0.89    0.63    0.37    0.23
    6  2  2  0  1.22   25.1    2.18    1.43    0.91    0.61
    6  3  2  0  1.80   25.2    3.96    2.82    0.75    1.11
    6  1  3  0  0.60   35.1    0.80    0.55    0.31    0.20
```

```
   6  2  3  0  1.22   35.1     2.29     1.59     1.03     0.61
   6  3  3  0  1.80   35.1     4.69     3.38     2.68     1.15
"Road Rater 2000"
   1  1  2  0  0.61   25.0     0.65     0.44     0.34     0.26
   1  2  2  0  1.16   25.0     1.32     0.95     0.72     0.52
   1  3  2  0  1.83   25.1     2.27     1.63     1.22     0.88
   1  4  2  0  2.39   25.0     3.22     2.30     1.66     1.22
   1  5  2  0  3.56   25.0     5.40     3.87     2.88     2.03
   2  1  2  0  0.57   25.1     0.72     0.44     0.34     0.22
   2  2  2  0  1.21   25.1     1.68     0.95     0.68     0.46
   2  3  2  0  1.81   25.0     2.66     1.52     1.09     0.73
   2  4  2  0  2.44   25.0     3.84     2.19     1.55     1.05
   2  5  2  0  3.60   25.1     6.14     3.56     2.47     1.66
   3  1  2  0  0.59   25.1     0.54     0.38     0.27     0.19
   3  2  2  0  1.20   25.1     1.20     0.85     0.61     0.40
   3  3  2  0  1.83   25.0     1.92     1.37     0.95     0.65
   3  4  2  0  2.43   25.0     2.73     2.02     1.40     0.94
   3  5  2  0  3.62   25.1     4.43     3.31     2.27     1.53
   4  1  2  0  0.60   25.1     0.71     0.44     0.30     0.20
   4  2  2  0  1.17   25.1     1.68     0.97     0.68     0.44
   4  3  2  0  1.81   25.1     2.82     1.59     1.10     0.71
   4  4  2  0  2.41   25.0     4.17     2.38     1.59     1.01
   4  5  2  0  3.61   25.0     7.01     3.99     2.64     1.67
   5  1  2  0  0.60   25.0     0.74     0.44     0.30     0.21
   5  2  2  0  1.18   25.0     1.64     1.00     0.67     0.44
   5  3  2  0  1.83   25.1     2.75     1.64     1.11     0.73
   5  4  2  0  2.44   25.1     3.90     2.35     1.55     1.00
   5  5  2  0  3.57   25.1     6.58     3.98     2.58     1.61
   6  1  1  0  0.59   15.0     0.87     0.45     0.32     0.23
   6  2  1  0  1.21   15.1     1.99     1.08     0.69     0.47
   6  3  1  0  1.78   15.1     3.29     1.77     1.18     0.72
   6  4  1  0  2.46   15.1     4.72     2.56     1.71     1.05
   6  5  1  0  3.62   15.1     8.35     4.95     3.18     1.97
   6  1  2  0  0.61   25.1     0.89     0.53     0.37     0.25
   6  2  2  0  1.19   25.0     1.94     1.18     0.82     0.55
   6  3  2  0  1.78   25.0     3.09     1.86     1.28     0.86
   6  4  2  0  2.45   25.1     4.50     2.74     1.85     1.25
   6  5  2  0  3.58   25.1     7.45     4.48     2.98     1.96
   6  1  3  0  0.60   35.1     0.81     0.48     0.34     0.23
   6  2  3  0  1.22   35.1     1.76     1.04     0.73     0.49
   6  3  3  0  1.80   35.1     2.81     1.69     1.14     0.76
   6  4  3  0  2.42   35.1     3.96     2.41     1.58     1.04
   6  5  3  0  3.62   35.1     6.68     4.01     2.58     1.66
"Dynatest FWD"
   1  2  0  382  355  205  118   71   46   34   18
   1  4  0  824  738  458  269  161  103   76   47
   2  2  0  388  360  193  104   61   42    0    0
   2  4  0  823  753  427  242  146   97    0    0
   3  2  0  381  281  176  101   63   41   28   14
   3  4  0  825  588  385  230  142   92   65   37
   4  2  0  378  358  195  106   61   38    0    0
   4  4  0  815  727  423  243  142   87    0    0
   5  2  0  379  334  217  122   70   44   35   22
   5  4  0  821  684  460  279  163  103   75   42
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  376  373  232  126   69   44    0    0
   6  3  0  587  556  358  199  113   69    0    0
   6  4  0  817  761  496  281  163   98    0    0




"S14"   3  "SR"    9   2190   8.0    175  "S"
"F. Shelby/Bartholomew CL to town of Hope"    2.40
"F. 7.4m. n. of SR46 northerly to near CR900N (NB)"    0.25
1  11299  78   8  2.0   0.00   9.0   0.0  13.0  "6"
"A-7-6"  12  "CL"     100.4  23.0   9  41.3  19.2  22.1  2.58
 38  3.4  0
2
"03-24-86"  1  0  1  1  1610  1640   80    0    0  65  35
```

```
"Dynaflect"
   1  0  1.0  8  0.42  0.32  0.24  0.20  0.12
   2  0  1.0  8  0.88  0.68  0.50  0.38  0.27
   3  0  1.0  8  0.83  0.60  0.38  0.25  0.12
   4  0  1.0  8  1.04  0.74  0.46  0.29  0.14
   5  0  1.0  8  1.20  0.87  0.56  0.37  0.20
   6  0  1.0  8  0.74  0.54  0.35  0.24  0.13
"Road Rater 2000"
   1  1  2  0  0.57   25.0    0.08    0.27    0.18    0.16
   1  2  2  0  1.19   24.6    0.13    0.58    0.40    0.33
   1  3  2  0  1.78   25.0    0.13    0.90    0.60    0.50
   1  4  2  0  2.39   25.0    0.09    1.21    0.83    0.69
   2  1  2  0  0.59   25.0    0.08    0.55    0.40    0.36
   2  2  2  0  1.18   25.0    0.13    1.10    0.83    0.73
   2  3  2  0  1.76   25.0    0.13    1.67    1.28    1.11
   2  4  2  0  2.41   25.0    0.10    2.30    1.76    1.50
   3  1  2  0  0.61   25.0    0.08    0.49    0.29    0.19
   3  2  2  0  1.20   25.0    0.13    1.03    0.66    0.42
   3  3  2  0  1.78   25.0    0.14    1.61    1.01    0.64
   3  4  2  0  2.43   25.0    0.11    2.31    1.45    0.90
   4  1  2  0  0.60   25.0    0.05    0.62    0.45    0.30
   4  2  2  0  1.22   25.0    0.12    1.34    0.97    0.66
   4  3  2  0  1.77   25.0    0.13    2.11    1.55    1.03
   4  4  2  0  2.40   25.0    0.08    3.00    2.14    1.43
   5  1  2  0  0.59   25.0    0.06    0.80    0.65    0.45
   5  2  2  0  1.21   25.0    0.12    1.77    1.40    1.04
   5  3  2  0  1.82   25.0    0.10    2.78    2.20    1.62
   5  4  2  0  2.40   25.0    0.09    3.89    3.03    2.22
   6  1  1  0  0.60   15.0    0.11    0.35    0.29    0.16
   6  2  1  0  1.20   14.9    0.13    0.76    0.57    0.31
   6  3  1  0  1.76   14.9    0.16    1.15    0.93    0.48
   6  4  1  0  2.44   15.0    0.13    1.70    1.42    0.69
   6  1  2  0  0.58   25.1    0.09    0.42    0.48    0.18
   6  2  2  0  1.20   25.2    0.12    0.88    1.02    0.39
   6  3  2  0  1.86   25.2    0.11    1.38    1.62    0.63
   6  4  2  0  2.39   25.1    0.11    1.87    2.17    0.83
   6  1  3  0  0.65   35.2    0.07    0.50    0.37    0.21
   6  2  3  0  1.22   35.2    0.12    1.04    0.73    0.41
   6  3  3  0  1.82   35.2    0.11    1.62    1.08    0.62
   6  4  3  0  2.44   35.1    0.14    2.29    1.48    0.88
"Dynatest FWD"
   1  2  0  437  104   81   61   45   32    0    0
   1  4  0  928  228  178  137  102   74    0    0
   2  2  0  429  226  170  121   85   59    0    0
   2  4  0  929  480  363  264  181  129    0    0
   3  2  0  432  260  192  119   69   41    0    0
   3  4  0  926  577  432  273  161   96    0    0
   4  2  0  426  340  244  140   84   46    0    0
   4  4  0  918  746  535  325  191  110    0    0
   5  2  0  426  357  264  163   96   59    0    0
   5  4  0  913  769  576  357  213  131    0    0
   6  1  0  212  110   83   47   32   14    0    0
   6  2  0  421  212  159   97   61   37    0    0
   6  3  0  656  347  259  162  100   63    0    0
   6  4  0  918  492  361  234  145   91    0    0
"08-08-86"  1  1  1  1  1300  1326  112  107    0  84  72
"Dynaflect"
   1  0  1.0  8  0.39  0.31  0.23  0.17  0.10
   2  0  1.0  8  0.96  0.77  0.53  0.36  0.23
   3  0  1.0  8  0.80  0.58  0.34  0.19  0.09
   4  0  1.0  8  0.92  0.67  0.40  0.22  0.12
   5  0  1.0  8  1.19  0.89  0.53  0.32  0.18
   6  0  1.0  8  0.70  0.54  0.34  0.20  0.12
"Road Rater 400"
   1  1  2  0  0.60   25.0    0.32    0.46    0.16    0.13
   1  2  2  0  1.22   25.0    0.77    0.92    0.49    0.36
   1  3  2  0  1.79   25.0    1.24    1.46    0.85    0.61
   2  1  2  0  0.59   25.0    0.85    0.75    0.61    1.55
   2  2  2  0  1.22   25.0    1.97    1.80    1.49    1.19
   2  3  2  0  1.80   25.0    3.16    2.92    2.37    1.92
   3  1  2  0  0.60   25.0    0.74    0.51    0.37    0.18
   3  2  2  0  1.21   25.0    1.65    1.23    0.57    0.41
   3  3  2  0  1.79   25.0    2.86    1.94    0.60    0.71
   4  1  2  0  0.61   25.0    0.87    0.66    0.41    0.24
   4  2  2  0  1.21   25.0    2.05    1.58    1.02    0.63
   4  3  2  0  1.82   25.1    4.01    3.47    8.75    1.24
   5  1  2  0  0.59   25.0    1.27    0.99    0.70    0.49
   5  2  2  0  1.21   25.0    3.38    2.92    1.86    2.28
   5  3  2  0  1.80   25.0    6.36    5.56    3.57    2.43
   6  1  1  0  0.59   15.1    0.52    0.49    0.28    0.16
   6  2  1  0  1.21   15.2    1.36    1.08    0.72    0.42
   6  1  2  0  0.60   25.1    0.62    0.47    0.29    1.20
   6  2  2  0  1.19   25.1    1.73    1.41    1.28    1.17
   6  3  2  0  1.81   25.1    2.78    2.35    1.53    0.99
   6  1  3  0  0.60   35.1    0.85    1.14    0.54    0.37
   6  2  3  0  1.21   35.1    2.47    2.66    6.85    1.11
   6  3  3  0  1.82   35.1    4.19    5.53   16.99    1.92
"Road Rater 2000"
   1  1  2  0  0.59   25.2    0.38    0.26    0.20    0.15
   1  2  2  0  1.20   25.2    0.79    0.52    0.40    0.29
   1  3  2  0  1.82   25.2    1.23    0.82    0.63    0.45
   1  4  2  0  2.40   25.2    1.64    1.12    0.85    0.61
   1  5  2  0  3.56   25.2    2.53    1.75    1.32    0.96
   2  1  2  0  0.57   25.2    0.96    0.70    0.58    0.44
   2  2  2  0  1.20   25.2    2.15    1.52    1.23    0.96
   2  3  2  0  1.77   25.2    3.31    2.34    1.86    1.43
   2  4  2  0  2.44   25.2    4.69    3.36    2.65    2.03
   2  5  2  0  3.57   25.2    7.60    5.29    4.09    3.05
   3  1  2  0  0.57   25.2    0.67    0.40    0.28    0.16
   3  2  2  0  1.23   25.1    1.55    0.99    0.63    0.36
   3  3  2  0  1.80   25.2    2.20    1.51    0.98    0.55
   3  4  2  0  2.44   25.2    3.14    2.15    1.39    0.77
   3  5  2  0  3.62   25.1    5.11    3.53    2.27    1.24
   4  1  2  0  0.60   25.2    0.87    0.62    0.44    0.29
   4  2  2  0  1.22   25.2    1.90    1.36    0.93    0.61
   4  3  2  0  1.80   25.2    3.06    2.19    1.52    0.96
   4  4  2  0  2.40   25.2    4.50    3.11    2.15    1.37
   4  5  2  0  3.62   25.2    7.56    5.22    3.59    2.25
   5  1  2  0  0.62   25.2    1.36    1.01    0.77    0.52
   5  2  2  0  1.18   25.2    2.72    2.00    1.48    1.03
   5  3  2  0  1.76   25.2    4.33    3.22    2.33    1.59
   5  4  2  0  2.43   25.2    6.50    4.83    3.47    2.33
   5  5  2  0  3.60   25.2   11.65    8.31    5.76    3.77
   6  1  1  0  0.60   15.0    0.65    0.36    0.26    0.17
   6  2  1  0  1.22   15.0    1.38    0.79    0.56    0.35
   6  3  1  0  1.76   15.0    2.33    1.29    0.90    0.57
   6  4  1  0  2.43   15.0    3.21    1.87    1.31    0.79
   6  5  1  0  3.61   15.0    5.03    3.42    2.38    1.42
   6  1  2  0  0.61   25.2    0.68    0.45    0.32    0.22
   6  2  2  0  1.16   25.1    1.38    0.94    0.69    0.45
   6  3  2  0  1.82   25.2    2.29    1.55    1.10    0.73
   6  4  2  0  2.45   25.2    3.25    2.24    1.59    1.04
   6  5  2  0  3.56   25.1    5.13    3.49    2.50    1.61
   6  1  3  0  0.60   35.1    0.77    0.56    0.44    0.33
   6  2  3  0  1.21   35.1    1.66    1.20    0.94    0.68
   6  3  3  0  1.81   35.1    2.63    1.94    1.51    1.06
   6  4  3  0  2.44   35.1    3.71    2.78    2.13    1.50
   6  5  3  0  3.62   35.1    6.07    4.49    3.44    2.41
"Dynatest FWD"
   1  2  0  400  133   91   67   45   34   22   08
   1  4  0  837  288  203  150  103   70   49   23
   2  2  0  394  322  229  152   96   64    0    0
   2  4  0  828  664  490  327  212  137    0    0
   3  2  0  387  314  209  117   63   32   15   11
   3  4  0  826  667  460  262  142   75   41   21
   4  2  0  384  351  237  136   72   42    0    0
   4  4  0  823  764  531  313  173   99    0    0
   5  2  0  377  471  320  175   96   53   37   28
   5  4  0  810  981  686  395  221  128   85   53
   6  1  0    0    0    0    0    0    0    0    0
```

```
     6  2  0  383  236  175  105   61   37    0    0
     6  3  0  595  373  281  171  102   62    0    0
     6  4  0  822  517  393  241  146   88    0    0




"S15"  10  "SR"    3   910  11.5   105  "S"
"F. SR203 to Clark/Scott CL"    0.72
"F. 3.9m. s. of SR356 southerly (betw. SR362 & SR203) (SB)"    0.25
1  11901  79   7  1.9   0.00   8.6   0.0   6.0  "G"
"A-4"    8  "CL"     112.5  18.0  12  23.7  16.2   7.5  2.59
 78  5.0  0
3
"03-21-86"  1  1  1  0  1430  1500   63    0    0  38  47
"Dynaflect"
   1  0  1.0  8  1.12  0.87  0.59  0.47  0.30
   2  0  1.0  8  0.88  0.67  0.45  0.37  0.23
   3  0  1.0  8  0.96  0.70  0.46  0.38  0.24
   4  0  1.0  8  0.90  0.70  0.48  0.40  0.26
   5  0  1.0  8  0.90  0.69  0.46  0.39  0.27
   6  0  1.0  8  1.05  0.79  0.52  0.42  0.26
"Road Rater 400"
   1  1  2  0  0.62   24.9    0.94    0.78    0.59    0.43
   1  2  2  0  1.20   24.9    1.81    1.56    1.20    0.89
   1  3  2  0  1.81   25.0    4.14    3.62    2.71    2.00
   2  1  2  0  0.61   24.9    0.81    0.74    0.52    0.39
   2  2  2  0  1.20   24.9    1.51    1.34    1.07    0.81
   2  3  2  0  1.81   25.0    3.48    3.00    2.33    1.78
   3  1  2  0  0.61   24.9    0.89    0.93    0.50    2.31
   3  2  2  0  1.20   24.9    1.65    1.39    0.98    2.19
   3  3  2  0  1.82   25.0    3.89    3.19    2.29    3.26
   4  1  2  0  0.58   24.9    0.73    0.63    0.43    0.22
   4  2  2  0  1.21   24.9    1.56    1.26    0.94    0.34
   4  3  2  0  1.83   25.0    3.37    2.61    1.95    2.39
   5  1  2  0  0.62   24.9    0.69    0.59    1.26    0.33
   5  2  2  0  1.19   24.9    1.52    1.32    2.52    0.61
   5  3  2  0  1.83   25.0    3.55    2.81    2.09    0.60
   6  1  1  0  0.64   15.0    0.78    0.58    0.47    0.76
   6  2  1  0  1.22   15.1    1.75    1.30    1.05    4.47
   6  1  2  0  0.60   24.9    0.92    0.75    0.57    1.78
   6  2  2  0  1.23   24.9    1.93    1.07    1.90    0.92
   6  3  2  0  1.80   24.9    4.26    3.67    0.97    2.04
   6  1  3  0  0.67   35.3    0.84    0.59    0.41    0.67
   6  2  3  0  1.21   35.3    1.61    1.22    0.86    1.09
   6  3  3  0  1.76   35.3    4.70    6.42   19.03    0.00
"Road Rater 2000"
   1  1  2  0  0.62   25.1    0.11    0.65    0.51    0.36
   1  2  2  0  1.20   25.1    0.15    1.40    0.97    0.76
   1  3  2  0  1.77   25.1    0.15    2.25    1.50    1.21
   1  4  2  0  2.37   25.1    0.11    3.30    2.14    1.72
   2  1  2  0  0.59   25.1    0.10    0.57    0.52    0.32
   2  2  2  0  1.18   25.1    0.15    1.23    1.12    0.68
   2  3  2  0  1.78   25.1    0.16    2.00    1.83    1.08
   2  4  2  0  2.36   25.1    0.10    2.81    2.63    1.51
   3  1  2  0  0.56   25.1    0.08    0.49    0.38    0.29
   3  2  2  0  1.22   25.2    0.14    1.13    0.89    0.66
   3  3  2  0  1.80   25.0    0.11    1.87    1.44    1.05
   3  4  2  0  2.39   25.1    0.12    2.61    2.01    1.46
   4  1  2  0  0.56   25.7    0.09    0.43    0.39    0.24
   4  1  2  0  0.58   25.2    0.06    0.45    0.41    0.27
   4  2  2  0  1.22   25.1    0.15    1.02    0.93    0.59
   4  3  2  0  1.82   25.1    0.14    1.67    1.48    0.94
   4  4  2  0  2.39   25.1    0.11    2.31    2.03    1.27
   5  1  2  0  0.60   25.1    0.10    0.50    0.39    0.28
   5  2  2  0  1.17   25.1    0.18    1.11    0.87    0.63
   5  3  2  0  1.84   25.1    0.13    1.90    1.46    1.05
   5  4  2  0  2.42   25.1    0.13    2.66    2.04    1.46
   6  1  1  0  0.61   15.0    0.11    0.56    0.50    0.33
   6  2  1  0  1.18   15.0    0.14    1.21    1.02    0.69
   6  3  1  0  1.78   15.0    0.15    2.02    1.68    1.13
   6  4  1  0  2.41   15.0    0.13    3.06    2.43    1.57
   6  1  2  0  0.58   25.1    0.09    0.61    0.58    0.31
   6  2  2  0  1.21   25.1    0.15    1.35    1.20    0.72
   6  3  2  0  1.83   25.1    0.13    2.21    1.79    1.19
   6  4  2  0  2.42   25.1    0.13    3.12    2.51    1.67
   6  1  3  0  0.62   35.2    0.08    0.44    0.35    0.23
   6  2  3  0  1.20   35.1    0.14    1.01    0.77    0.49
   6  3  3  0  1.84   35.1    0.13    1.60    1.25    0.78
   6  4  3  0  2.39   35.0    0.11    2.24    1.70    1.11
"04-24-86"  0  0  0  1  1000  1030   74    0    0  64  50
"Dynatest FWD"
   1  2  0  401  401  302  176  122   80    0    0
   1  4  0  850  817  630  422  273  178    0    0
   2  2  0  405  334  256  166  105   66    0    0
   2  4  0  864  695  543  365  236  148    0    0
   3  2  0  401  369  273  167  102   64    0    0
   3  4  0  856  749  566  372  229  147    0    0
   4  2  0  399  400  275  174  105   64    0    0
   4  4  0  852  818  595  387  241  148    0    0
   5  2  0  397  409  271  156   92   59   42   25
   5  4  0  849  813  574  352  217  139   96   57
   6  1  0  159  150  103   59   33   21    0    0
   6  2  0  395  428  307  187  112   68    0    0
   6  3  0  621  673  495  310  190  113    0    0
   6  4  0  348  904  672  433  264  160    0    0
"08-07-86"  1  1  1  1  1520  1548  104  102  102  81  72
"Dynaflect"
   1  0  1.0  8  0.83  0.63  0.42  0.29  0.20
   2  0  1.0  8  0.75  0.57  0.38  0.26  0.17
   3  0  1.0  8  0.79  0.60  0.40  0.27  0.17
   4  0  1.0  8  0.78  0.58  0.39  0.27  0.18
   5  0  1.0  8  0.80  0.57  0.37  0.25  0.17
   6  0  1.0  8  0.86  0.65  0.44  0.29  0.18
"Road Rater 400"
   1  1  2  0  0.60   25.1    0.71    0.50    0.38    0.27
   1  2  2  0  1.21   25.1    1.46    1.05    0.78    0.60
   1  3  2  0  1.82   25.1    2.80    2.03    2.71    1.05
   2  1  2  0  0.59   25.0    0.70    0.74    0.38    0.27
   2  2  2  0  1.21   25.0    1.57    0.72    0.87    0.66
   2  3  2  0  1.82   25.1    2.86    2.27    1.59    1.17
   3  1  2  0  0.60   25.0    0.71    0.55    0.44    0.29
   3  2  2  0  1.21   25.0    1.57    1.25    0.73    0.64
   3  3  2  0  1.81   25.1    2.85    1.83    2.69    1.07
   4  1  2  0  0.60   25.0    0.65    0.44    0.33    0.23
   4  2  2  0  1.21   25.0    1.41    1.15    0.75    0.55
   4  3  2  0  1.81   25.1    2.57    1.77    1.32    0.95
   5  1  2  0  0.60   25.0    0.73    0.49    0.36    0.26
   5  2  2  0  1.19   25.0    1.61    1.12    0.78    0.60
   5  3  2  0  1.80   25.1    3.06    2.22    1.36    1.05
   6  1  1  0  0.60   15.1    0.64    0.50    0.34    0.23
   6  2  1  0  1.19   15.1    1.56    1.15    0.82    0.55
   6  1  2  0  0.60   25.0    0.83    0.57    0.47    0.36
   6  2  2  0  1.20   25.0    1.79    1.42    1.01    0.80
   6  3  2  0  1.79   25.0    3.25    2.51    1.79    1.36
   6  1  3  0  0.60   35.0    0.66    0.97    0.33    0.22
   6  2  3  0  1.21   34.9    1.86    1.42    0.92    0.64
   6  3  3  0  1.78   35.1    4.27    4.15   14.84    1.47
"Road Rater 2000"
   1  1  2  0  0.60   25.2    0.68    0.47    0.41    0.27
   1  2  2  0  1.21   25.2    1.52    1.04    0.80    0.56
   1  3  2  0  1.81   25.2    2.48    1.67    1.23    0.85
   1  4  2  0  2.41   25.2    3.64    2.45    1.74    1.21
   1  5  2  0  3.60   25.2    6.44    4.28    2.91    1.96
   2  1  2  0  0.62   25.2    0.76    0.49    0.37    0.30
   2  2  2  0  1.23   25.2    1.59    1.05    0.74    0.62
   2  3  2  0  1.84   25.2    2.56    1.65    1.16    0.93
   2  4  2  0  2.40   25.2    3.57    2.33    1.60    1.27
   2  5  2  0  3.57   25.1    6.40    4.01    2.77    2.02
   3  1  2  0  0.61   25.2    0.76    0.47    0.35    0.28
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    3  2  2  0  1.21   25.2    1.62    1.00    0.75    0.57
    3  3  2  0  1.81   25.2    2.60    1.64    1.16    0.87
    3  4  2  0  2.40   25.2    3.76    2.37    1.63    1.22
    3  5  2  0  3.59   25.2    6.76    4.22    2.83    2.02
    4  1  2  0  0.64   25.2    0.70    0.44    0.36    0.24
    4  2  2  0  1.23   25.2    1.45    0.95    0.67    0.49
    4  3  2  0  1.81   25.2    2.32    1.50    1.07    0.76
    4  4  2  0  2.41   25.1    3.40    2.21    1.52    1.06
    4  5  2  0  3.59   25.2    6.06    3.89    2.62    1.76
    5  1  2  0  0.64   25.2    0.75    0.51    0.37    0.27
    5  2  2  0  1.23   25.2    1.56    1.01    0.72    0.51
    5  3  2  0  1.81   25.2    2.51    1.65    1.13    0.81
    5  4  2  0  2.37   25.2    3.60    2.30    1.56    1.09
    5  5  2  0  3.59   25.1    6.49    4.12    2.63    1.82
    6  1  1  0  0.61   15.0    0.80    0.50    0.39    0.26
    6  2  1  0  1.22   15.0    1.77    1.12    0.79    0.52
    6  3  1  0  1.82   15.0    2.92    1.93    1.27    0.81
    6  4  1  0  2.34   15.0    4.29    2.68    1.92    1.12
    6  4  1  0  2.37   15.0    4.26    2.73    1.91    1.11
    6  5  1  0  3.59   15.0    8.61    5.67    3.50    2.12
    6  1  2  0  0.58   25.1    0.87    0.57    0.43    0.36
    6  2  2  0  1.20   25.1    1.90    1.27    0.84    0.73
    6  3  2  0  1.81   25.1    3.13    2.10    1.34    1.12
    6  4  2  0  2.41   25.1    4.59    3.02    1.95    1.57
    6  5  2  0  3.59   25.1    8.31    5.40    3.45    2.58
    6  1  3  0  0.63   35.0    0.85    0.50    0.32    0.24
    6  2  3  0  1.23   35.1    1.79    1.07    0.64    0.49
    6  3  3  0  1.79   35.1    2.97    1.76    0.97    0.78
    6  4  3  0  2.41   35.1    4.52    2.68    1.31    1.14
    6  5  3  0  3.60   35.1    8.95    4.87    2.75    1.98
"Dynatest FWD"
    1  2  0  379  312  195  116   77   53   39   25
    1  4  0  817  654  445  273  179  123   90   56
    2  2  0  383  301  191  114   73   48    0    0
    2  4  0  816  631  425  269  171  113    0    0
    3  2  0  378  319  199  117   75   50   39   25
    3  4  0  811  664  444  280  174  120   86   51
    4  2  0  377  313  183  108   72   47    0    0
    4  4  0  815  661  424  260  169  111    0    0
    5  2  0  378  363  218  120   71   47   36   22
    5  4  0  801  751  480  284  170  110   80   47
    6  1  0    0    0    0    0    0    0    0    0
    6  2  0  371  375  250  143   85   54    0    0
    6  3  0  582  600  420  243  151   92    0    0
    6  4  0  797  819  578  350  214  131    0    0



"S16"  55  "SR"  135   1610  11.0    177  "S"
"F. Brown/Morgan CL to s. Morgantown C/L"    1.91
"F. 0.8m. s. of SR252W southerly (SB)"    0.25
1  10963  77   9  1.8   0.00   6.2   0.0   8.6  "6"
"A-6"     7  "CL"     107.8  19.9  10  29.4  14.8  14.6  2.74
 70  5.0  0
2
"03-25-86"  1  1  0  1  1510  1635   93    0    0  75  34
"Dynaflect"
   1  0  1.0  8  1.23  0.89  0.75  0.40  0.25
   2  0  1.0  8  1.11  0.79  0.68  0.35  0.23
   3  0  1.0  8  1.21  0.87  0.71  0.37  0.23
   4  0  1.0  8  1.12  0.81  0.65  0.37  0.24
   5  0  1.0  8  1.15  0.79  0.52  0.36  0.24
   6  0  1.0  8  1.23  0.89  0.59  0.41  0.27
"Road Rater 400"
   1  1  2  0  0.64   25.3    0.94    0.74    0.48    0.33
   1  2  2  0  1.25   25.3    1.91    1.46    0.96    0.71
   1  3  2  0  1.89   25.4    3.99    3.29    2.03    1.22
   2  1  2  0  0.60   24.9    0.76    0.56    1.36    0.20
   2  2  2  0  1.21   24.9    1.71    1.92    2.93    0.46
   2  3  2  0  1.32   24.9    3.66    2.51    1.62    0.94
   3  1  2  0  0.59   24.9    0.86    0.55    1.34    0.20
   3  2  2  0  1.22   24.9    1.86    1.93    2.99    0.35
   3  3  2  0  1.80   24.9    2.49    3.09    1.70    0.99
   4  1  2  0  0.58   24.9    0.70    0.47    0.31    0.13
   4  2  2  0  1.20   24.9    1.56    1.40    0.68    0.41
   4  3  2  0  1.77   24.9    3.41    2.46    1.57    0.91
   5  1  2  0  0.60   24.9    0.77    0.53    0.34    0.23
   5  2  2  0  1.20   24.9    1.30    1.28    0.74    0.49
   5  3  2  0  1.82   24.9    4.31    3.05    1.54    1.59
   6  1  1  0  0.61   15.0    0.76    0.57    0.37    0.27
   6  2  1  0  1.23   15.0    1.80    1.31    0.88    0.60
   6  1  2  0  0.61   25.0    0.77    0.58    0.36    0.20
   6  2  2  0  1.24   25.1    1.82    1.29    0.84    0.25
   6  3  2  0  1.82   25.1    4.18    3.03    1.80    1.08
   6  1  3  0  0.58   35.0    0.64    0.49    0.25    0.14
   6  2  3  0  1.27   35.1    4.92    3.77    6.50    5.74
   6  3  3  0  1.49   35.0    6.23    4.38    4.38    5.80
"Dynatest FWD"
   1  2  0  407  364  250  147   86   51    0    0
   1  4  0  880  787  551  338  204  128    0    0
   2  2  0  417  373  229  131   73   45    0    0
   2  4  0  889  774  501  293  171  105    0    0
   3  2  0  411  360  243  135   77   48    0    0
   3  4  0  883  759  529  308  178  112    0    0
   4  2  0  410  326  218  123   67   43    0    0
   4  4  0  903  704  481  285  167  108    0    0
   5  2  0  409  398  237  124   72   42    0    0
   5  4  0  905  780  492  284  166  106    0    0
   6  1  0  198  164  100   55   33   23    0    0
   6  2  0  408  381  246  135   81   52    0    0
   6  3  0  635  567  378  219  128   84    0    0
   6  4  0  885  771  522  306  184  118    0    0
"08-11-86"  1  1  1  1  1340  1510  100  103   98  72  71
"Dynaflect"
   1  0  1.0  8  0.99  0.72  0.44  0.28  0.20
   2  0  1.0  8  0.82  0.60  0.37  0.25  0.17
   3  0  1.0  8  0.86  0.61  0.38  0.26  0.18
   4  0  1.0  8  0.75  0.56  0.37  0.26  0.19
   5  0  1.0  8  0.88  0.64  0.40  0.28  0.21
   6  0  1.0  8  0.96  0.70  0.44  0.31  0.23
"Road Rater 400"
   1  1  2  0  0.60   25.0    0.68    0.81    0.29    0.21
   1  2  2  0  1.26   25.0    1.71    2.09    0.74    0.55
   1  3  2  0  1.86   25.1    2.90    3.50    1.33    0.87
   2  1  2  0  0.60   25.0    0.54    0.69    0.33    0.17
   2  2  2  0  1.20   25.0    1.48    1.80    0.63    0.46
   2  3  2  0  1.81   25.1    2.49    3.02    1.17    0.75
   3  1  2  0  0.58   25.0    0.51    0.63    0.31    0.17
   3  2  2  0  1.22   25.0    1.38    1.77    0.82    0.47
   3  3  2  0  1.86   25.1    2.46    3.20    1.42    0.79
   4  1  2  0  0.59   25.0    0.49    0.54    0.26    0.14
   4  2  2  0  1.23   25.1    1.30    1.49    0.72    0.42
   4  3  2  0  1.87   25.1    2.06    2.65    1.26    0.73
   5  1  2  0  0.59   25.0    0.55    0.68    0.32    0.19
   5  2  2  0  1.20   25.0    1.43    1.91    0.89    0.55
   5  3  2  0  1.84   25.1    4.16    3.80    1.66    0.99
   6  1  1  0  0.61   15.2    0.75    0.82    0.41    0.26
   6  2  1  0  1.29   15.3    1.87    2.19    1.07    0.63
   6  1  2  0  0.60   24.9    0.75    0.80    0.34    0.22
   6  2  2  0  1.21   24.9    1.77    2.22    0.94    0.61
   6  3  2  0  1.80   24.9    3.32    4.45    1.83    1.10
   6  1  3  0  0.59   34.8    0.47    0.78    0.18    0.21
   6  2  3  0  1.07   34.8    3.44    4.91    1.68    1.32
"Road Rater 2000"
   1  1  2  0  0.59   25.0    0.87    0.47    0.30    0.18
   1  2  2  0  1.20   25.0    1.93    1.06    0.66    0.39
   1  3  2  0  1.80   25.0    3.12    1.72    1.09    0.62
   1  4  2  0  2.39   25.0    4.44    2.46    1.53    0.85
   1  5  2  0  3.60   25.0    7.47    4.21    2.52    1.39
```

```
    2  1  2  0  0.60   25.0    0.65    0.38    0.25    0.16
    2  2  2  0  1.20   25.0    1.41    0.84    0.55    0.34
    2  3  2  0  1.80   25.0    2.32    1.37    0.86    0.54
    2  4  2  0  2.41   25.0    3.39    1.99    1.24    0.75
    2  5  2  0  3.59   25.0    5.84    3.33    2.03    1.19
    3  1  2  0  0.62   25.0    0.69    0.43    0.27    0.17
    3  2  2  0  1.22   25.0    1.53    0.91    0.58    0.35
    3  3  2  0  1.83   25.0    2.42    1.48    0.91    0.54
    3  4  2  0  2.40   25.0    3.44    2.12    1.29    0.74
    3  5  2  0  3.58   25.0    6.00    3.66    2.16    1.23
    4  1  2  0  0.58   25.0    0.65    0.33    0.21    0.14
    4  2  2  0  1.24   25.0    1.45    0.76    0.45    0.31
    4  3  2  0  1.82   25.0    2.33    1.21    0.72    0.46
    4  4  2  0  2.42   25.0    3.34    1.76    1.03    0.65
    4  5  2  0  3.58   25.0    5.58    2.96    1.64    1.04
    5  1  2  0  0.62   25.1    0.78    0.45    0.29    0.19
    5  2  2  0  1.24   25.0    1.74    1.00    0.65    0.40
    5  3  2  0  1.84   25.0    2.76    1.57    0.98    0.61
    5  4  2  0  2.42   25.0    3.94    2.25    1.39    0.85
    5  5  2  0  3.60   25.0    6.70    3.80    2.26    1.35
    6  1  1  0  0.59   15.2    0.84    0.50    0.35    0.24
    6  2  1  0  1.22   15.2    1.83    1.16    0.73    0.50
    6  3  1  0  1.79   15.2    2.88    1.76    1.17    0.72
    6  4  1  0  2.40   15.2    4.31    2.62    1.70    1.04
    6  5  1  0  3.65   15.2    7.74    4.57    2.87    1.69
    6  1  2  0  0.61   25.2    0.82    0.46    0.31    0.23
    6  2  2  0  1.21   25.2    1.77    1.00    0.66    0.46
    6  3  2  0  1.81   25.1    2.90    1.65    1.05    0.72
    6  4  2  0  2.40   25.2    4.16    2.39    1.48    0.99
    6  5  2  0  3.60   25.2    7.04    4.04    2.38    1.55
    6  1  3  0  0.61   35.2    0.72    0.42    0.26    0.17
    6  2  3  0  1.21   35.2    1.65    0.97    0.59    0.38
    6  3  3  0  1.80   35.2    2.76    1.59    0.95    0.60
    6  4  3  0  2.43   35.2    4.00    2.32    1.36    0.86
    6  5  3  0  3.64   35.2    6.88    3.95    2.25    1.39
"Dynatest FWD"
    1  2  0  391  421  248  134   77   45   35   26
    1  4  0  830  878  544  312  176  109   79   50
    2  2  0  387  350  221  125   72   41    0    0
    2  4  0  822  747  491  287  167   97    0    0
    3  2  0  384  353  223  120   69   39   32   25
    3  4  0  821  766  500  284  160   99   72   43
    4  2  0  382  298  189  105   60   35    0    0
    4  4  0  824  655  433  249  146   91    0    0
    5  2  0  383  357  210  114   65   41   33   23
    5  4  0  820  736  463  257  147   93   74   47
    6  1  0    0    0    0    0    0    0    0    0
    6  2  0  379  407  232  113   67   42    0    0
    6  3  0  589  608  357  187  108   68    0    0
    6  4  0  812  819  487  265  152   97    0    0



"S16m" 55  "SR"  135   1610  11.0    177  "S"
"F. Brown/Morgan CL to s. Morgantown C/L"    1.91
"F. 0.9m. s. of SR252W southerly (SB)"    0.25
1  10963  77   9  1.8   0.00   6.2   0.0   8.6  "6"
"A-6"     7  "CL"     107.8  19.9  10  29.4  14.8  14.6  2.74
 70  5.0  0
1
"03-25-86"  1  1  0  1  1510  1635   93    0    0  75  34
"Dynaflect"
   1  0  1.0  8  1.25  0.90  0.59  0.39  0.25
   2  0  1.0  8  1.10  0.75  0.47  0.32  0.21
   3  0  1.0  8  1.17  0.78  0.48  0.32  0.22
   4  0  1.0  8  1.09  0.79  0.51  0.35  0.22
   5  0  1.0  8  1.16  0.80  0.51  0.36  0.24
   6  0  1.0  8  1.09  0.79  0.54  0.38  0.26
"Road Rater 400"
```

```
   1  1  2  0  0.59   25.0    0.81    0.57    0.57    0.20
   1  2  2  0  1.19   25.0    1.81    1.38    0.69    0.48
   1  3  2  0  1.81   25.1    3.85    2.71    1.72    1.01
   2  1  2  0  0.61   25.0    0.82    0.50    0.44    0.13
   2  2  2  0  1.21   25.0    1.84    1.27    0.81    0.38
   2  3  2  0  1.84   25.1    3.91    2.56    1.69    0.81
   3  1  2  0  0.60   25.0    0.77    0.52    0.31    0.17
   3  2  2  0  1.23   25.0    1.83    1.32    0.74    0.44
   3  3  2  0  1.83   25.0    3.82    3.32    1.44    0.85
   4  1  2  0  0.60   25.0    0.71    0.46    0.64    0.14
   4  2  2  0  1.23   25.0    1.62    1.17    1.53    0.26
   4  3  2  0  1.85   25.1    3.68    2.46    1.37    9.97
   5  1  2  0  0.60   25.0    0.84    0.56    0.31    0.19
   5  2  2  0  1.21   25.0    2.01    1.41    0.77    0.56
   5  3  2  0  1.82   25.0    4.74    3.14    1.64    1.06
   6  1  1  0  0.60   14.9    0.70    0.54    0.43    0.28
   6  2  1  0  1.23   15.0    1.58    1.17    0.83    0.63
   6  1  2  0  0.60   25.0    0.65    0.45    0.44    0.19
   6  2  2  0  1.22   25.0    1.52    1.24    0.60    0.41
   6  3  2  0  1.82   25.0    3.22    2.53    1.39    0.97
   6  1  3  0  0.60   35.1    0.55    0.37    0.20    0.08
   6  2  3  0  1.18   35.1    1.32    0.91    0.53    0.17
   6  3  3  0  1.82   35.1    3.95    3.09    2.56    2.71
"Dynatest FWD"
   1  2  0  418  351  249  135   76   44  0  0
   1  4  0  881  757  526  304  167  102  0  0
   2  2  0  409  371  214  109   57   37  0  0
   2  4  0  886  784  470  248  136   85  0  0
   3  2  0  406  384  224  113   62   38  0  0
   3  4  0  886  815  510  265  148   92  0  0
   4  2  0  402  289  201  116   65   42  0  0
   4  4  0  897  646  455  266  156   98  0  0
   5  2  0  404  371  214  111   64   42  0  0
   5  4  0  885  778  464  255  143   96  0  0
   6  1  0  200  155   95   52   31   22  0  0
   6  2  0  402  314  205  116   71   49  0  0
   6  3  0  639  494  328  187  116   78  0  0
   6  4  0  889  685  456  264  163  109  0  0



"V6"   19  "US"  231   5800  19.5   1131  "S"
"F. Spencer/Dubois CL northerly to s. Huntingburg C/L"    5.15
"F. 3.5m. n. of I64 northerly to CR900S (3.75m. s. of SR64) (SB)"   0.25
1  14628  85   1  1.2   0.00   4.7   0.0  13.1  "G"
"A-6"     6  "CL"     110.8  17.5  10  35.8  19.1  16.7  2.76
 57  2.9  0
3
"03-19-86"  1  1  1  0  0945  1045   42    0    0  49  46
"Dynaflect"
   1  0  1.0  8  0.82  0.61  0.44  0.35  0.23
   2  0  1.0  8  0.89  0.60  0.35  0.25  0.15
   3  0  1.0  8  0.71  0.48  0.28  0.20  0.10
   4  0  1.0  8  0.57  0.36  0.20  0.14  0.07
   5  0  1.0  8  0.81  0.53  0.31  0.21  0.12
   6  0  1.0  8  0.75  0.51  0.30  0.21  0.11
"Road Rater 400"
   1  1  2  0  0.59   24.8    1.06    1.20    1.06    0.60
   1  2  2  0  1.22   24.9    2.03    1.74    1.10    1.22
   1  3  2  0  1.79   24.9    2.82    2.83    2.00    1.70
   2  1  2  0  0.59   24.8    1.36    0.98    0.66    0.52
   2  2  2  0  1.22   24.9    2.73    1.99    1.24    1.05
   2  3  2  0  1.83   24.9    4.33    3.63    3.67    1.60
   3  1  2  0  0.60   24.8    1.05    0.82    0.51    0.39
   3  2  2  0  1.18   24.9    1.93    1.58    1.06    0.70
   3  3  2  0  1.82   24.9    2.97    2.99    1.48    1.03
   4  1  2  0  0.56   24.8    0.80    0.53    0.19    0.17
   4  2  2  0  1.20   24.9    1.43    1.00    0.76    0.32
   4  3  2  0  1.79   24.9    2.02    1.58    1.23    0.46
```

```
  5  1  2  0  0.60   24.8    1.19    1.05    0.52    0.36
  5  2  2  0  1.22   25.1    2.46    1.63    1.15    0.72
  5  3  2  0  1.86   25.1    4.16    2.92    2.94    1.70
  6  1  1  0  0.61   15.2    2.34    2.16    1.27    0.87
  6  2  1  0  1.21   15.2    2.64    2.08    1.30    1.17
  6  1  2  0  0.61   25.0    2.49    1.12    0.90    0.34
  6  2  2  0  1.22   25.0    2.20    1.97    1.28    0.77
  6  3  2  0  1.87   25.1    3.33    2.98    1.53    1.15
  6  1  3  0  0.66   34.8    1.21    1.04    0.63    0.38
  6  2  3  0  1.17   34.8    2.23    1.90    1.18    0.71
  6  3  3  0  1.73   34.8    3.46    2.64    1.86    1.35
"Road Rater 2000"
  1  1  2  0  0.64   25.1    0.24    0.18    0.00    0.35
  1  2  2  0  1.25   25.2    0.35    0.27    0.00    0.58
  1  3  2  0  1.78   25.2    0.43    0.31    0.00    0.57
  1  4  2  0  2.45   25.1    0.55    0.37    0.00    0.75
  1  5  2  0  3.51   25.2    0.94    0.61    0.00    1.76
  2  1  2  0  0.60   25.2    0.18    0.14    0.00    1.07
  2  2  2  0  1.20   25.1    0.34    0.25    0.00    2.31
  2  3  2  0  1.78   25.1    0.40    0.31    0.00    2.27
  2  4  2  0  2.39   25.1    0.53    0.40    0.00    2.40
  2  5  2  0  3.60   25.1    0.93    0.64    0.00    2.68
  3  1  2  0  0.55   25.1    0.18    0.13    0.00    1.31
  3  2  2  0  1.18   25.2    0.34    0.25    0.00    1.91
  3  3  2  0  1.81   25.2    0.47    0.33    0.00    7.86
  3  4  2  0  2.42   25.2    0.55    0.39    0.00    1.67
  3  5  2  0  3.64   25.2    0.88    0.63    0.00    4.61
  4  1  2  0  0.56   25.1    0.18    0.15    0.00    0.49
  4  2  2  0  1.25   25.2    0.35    0.27    0.01    0.67
  4  3  2  0  1.84   25.1    0.46    0.33    0.00    0.63
  4  4  2  0  2.36   25.2    0.56    0.37    0.00    0.87
  4  5  2  0  3.66   25.1    0.85    0.61    0.00    1.17
  5  1  2  0  0.61   25.2    0.19    0.14    0.01    0.94
  5  2  2  0  1.16   25.2    0.35    0.26    0.00    1.71
  5  3  2  0  1.79   25.1    0.45    0.32    0.00    1.90
  5  4  2  0  2.37   25.1    0.60    0.38    0.00    2.13
  5  5  2  0  3.62   25.1    0.90    0.69    0.01    2.50
  6  1  1  0  0.56   15.2    0.20    0.16    0.00    0.66
  6  2  1  0  1.21   15.1    0.38    0.24    0.00    0.82
  6  3  1  0  1.84   15.1    0.50    0.33    0.00    1.40
  6  4  1  0  2.38   15.1    0.71    0.45    0.01    1.30
  6  5  1  0  3.67   15.2    1.41    0.84    0.01    2.40
  6  1  2  0  0.62   25.2    0.19    0.29    0.00    0.34
  6  2  2  0  1.15   25.2    0.39    0.50    0.00    0.42
  6  3  2  0  1.77   25.2    0.51    0.69    0.01    0.64
  6  4  2  0  2.36   25.2    1.01    1.10    0.01    1.23
  6  5  2  0  3.66   25.2    0.81    0.57    0.00    8.44
  6  1  3  0  0.62   35.2    0.14    0.13    0.00    0.39
  6  2  3  0  1.21   35.2    0.27    0.19    0.00    1.09
  6  3  3  0  1.72   35.2    0.33    0.22    0.00    1.65
"04-22-86"  0  0  0  1  0845  0915   50     0     0  40  53
"Dynatest FWD"
  1  2  0  444  248  194  131   95   69    0    0
  1  4  0  931  484  385  277  205  154    0    0
  2  2  0  434  265  190  126   79   51    0    0
  2  4  0  926  507  385  261  173  114    0    0
  3  2  0  437  250  187  121   79   48    0    0
  3  4  0  926  472  363  252  169  108    0    0
  4  2  0  440  196  134   75   39   23    0    0
  4  4  0  927  365  264  155   87   51    0    0
  5  2  0  434  296  211  119   73   43   28   12
  5  4  0  914  559  413  260  167  103   66   28
  6  1  0  215  103   81   42   30   16    0    0
  6  2  0  436  221  160  108   63   41    0    0
  6  3  0  679  329  251  165  104   65    0    0
  6  4  0  924  432  333  222  143   91    0    0
"08-06-86"  1  1  1  1  0745  0835   78   79   79   0  70
"Dynaflect"
  1  0  1.0  8  0.58  0.47  0.36  0.27  0.20
  2  0  1.0  8  0.56  0.42  0.30  0.20  0.13
```

```
    3  0  1.0  8  0.51  0.37  0.25  0.15  0.10
    4  0  1.0  8  0.43  0.30  0.18  0.11  0.07
    5  0  1.0  3  0.65  0.47  0.32  0.21  0.13
    6  0  1.0  8  0.49  0.35  0.24  0.15  0.10
"Road Rater 400"
    1  1  2  0  0.60    25.1     0.49     0.43     0.32     0.34
    1  2  2  0  1.20    25.1     1.06     0.98     0.18     0.72
    2  1  2  0  0.60    25.1     0.66     0.52     0.43     0.13
    2  2  2  0  1.21    25.1     1.49     1.18     0.98     0.44
    2  3  2  0  1.78    25.1     2.65     2.37     1.72     1.36
    3  1  2  0  0.61    25.1     0.54     0.38     0.28     0.16
    3  2  2  0  1.21    25.1     1.16     0.98     0.59     0.39
    3  3  2  0  1.79    25.1     2.24     2.17     1.14     0.89
    4  1  2  0  0.60    25.1     0.42     0.29     0.18     0.09
    4  2  2  0  1.20    25.1     0.88     0.82     0.36     0.21
    4  3  2  0  1.80    25.1     1.77     1.25     0.74     1.04
    5  1  2  0  0.60    25.1     0.68     0.52     0.36     0.25
    5  2  2  0  1.20    25.1     1.58     1.50     0.84     0.59
    5  3  2  0  1.79    25.1     3.24     2.53     1.65     1.15
    6  1  1  0  0.61    15.2     0.37     0.29     0.18     0.10
    6  2  1  0  1.22    15.1     0.90     0.62     0.41     0.26
    6  1  2  0  0.60    25.1     0.53     0.40     0.27     0.18
    6  2  2  0  1.19    25.1     1.16     0.96     0.61     0.63
    6  3  2  0  1.83    25.1     2.60     1.49     1.34     0.89
    6  1  3  0  0.59    35.1     0.47     0.36     0.26     0.18
    6  2  3  0  1.21    35.1     1.15     0.95     0.66     0.49
    6  2  3  0  1.49    35.1     2.99     2.80     1.88     1.31
    6  3  3  0  2.09    35.1     3.11     2.70     1.90     1.32
"Road Rater 2000"
    1  1  2  0  0.62    25.2     0.53     0.42     0.39     0.36
    1  2  2  0  1.24    25.2     1.09     0.90     0.79     0.71
    1  3  2  0  1.80    25.2     1.68     1.35     1.16     1.01
    1  4  2  0  2.40    25.2     2.36     1.90     1.58     1.38
    1  5  2  0  3.61    25.2     4.05     3.18     2.52     2.09
    2  1  2  0  0.60    25.2     0.68     0.51     0.41     0.34
    2  2  2  0  1.17    25.2     1.50     1.16     0.90     0.73
    2  3  2  0  1.82    25.2     2.49     1.90     1.46     1.18
    2  4  2  0  2.43    25.2     3.56     2.70     2.08     1.67
    2  5  2  0  3.62    25.1     6.12     4.66     3.57     2.74
    3  1  2  0  0.56    25.1     0.47     0.35     0.24     0.17
    3  2  2  0  1.21    25.2     1.13     0.80     0.57     0.41
    3  3  2  0  1.81    25.2     1.85     1.31     0.90     0.62
    3  4  2  0  2.41    25.2     2.74     1.93     1.29     0.90
    3  5  2  0  3.59    25.1     4.75     3.32     2.21     1.50
    4  1  2  0  0.59    25.2     0.37     0.25     0.15     0.13
    4  2  2  0  1.21    25.2     0.84     0.54     0.33     0.23
    4  3  2  0  1.82    25.2     1.36     0.89     0.53     0.35
    4  4  2  0  2.42    25.1     1.92     1.23     0.72     0.48
    4  5  2  0  3.55    25.2     3.22     2.02     1.21     0.73
    5  1  2  0  0.61    25.2     0.69     0.53     0.42     0.30
    5  2  2  0  1.19    25.2     1.52     1.15     0.88     0.63
    5  3  2  0  1.85    25.2     2.66     1.97     1.44     1.04
    5  4  2  0  2.40    25.2     3.76     2.77     2.02     1.43
    5  5  2  0  3.60    25.2     7.06     5.04     3.56     2.42
    6  1  1  0  0.61    15.1     0.44     0.29     0.21     0.14
    6  2  1  0  1.22    15.1     0.95     0.64     0.43     0.30
    6  3  1  0  1.81    15.1     1.58     1.06     0.70     0.47
    6  4  1  0  2.41    15.1     2.33     1.51     1.09     0.71
    6  5  1  0  3.57    15.1     4.74     2.82     2.12     1.37
    6  1  2  0  0.57    25.1     0.56     0.36     0.27     0.21
    6  2  2  0  1.20    25.2     1.21     0.83     0.53     0.45
    6  3  2  0  1.74    25.2     1.84     1.27     0.84     0.67
    6  4  2  0  2.44    25.1     2.71     1.84     1.22     0.95
    6  5  2  0  3.63    25.1     4.64     3.07     2.03     1.49
    6  1  3  0  0.61    35.3     0.57     0.36     0.27     0.23
    6  2  3  0  1.21    35.2     1.23     0.80     0.55     0.47
    6  3  3  0  1.84    35.2     2.01     1.29     0.89     0.72
    6  4  3  0  2.41    35.2     2.88     1.81     1.17     0.98
    6  5  3  0  3.60    35.1     5.47     3.04     1.97     1.56
"Dynatest FWD"
```

```
   1  2  0  407  243  130  134   95   59   51   31
   1  4  0  859  505  330  294  214  144  114   67
   2  2  0  403  282  146  128   83   40    0    0
   2  4  0  855  585  262  280  189  128    0    0
   3  2  0  402  252  171  119   71   47   27   10
   3  4  0  856  545  393  271  177  115   69   30
   4  2  0  403  215  126   63   34   17    0    0
   4  4  0  857  460  286  150   82   46    0    0
   5  2  0  391  298  208  122   71   43   27   15
   5  4  0  841  633  463  295  179  110   69   33
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  399  206  141   80   48   29    0    0
   6  3  0  622  319  224  133   81   49    0    0
   6  4  0  856  435  308  189  119   71    0    0




"V7"   19  "US"  231  10200  19.5   1989  "S"
"F. n. Huntingburg C/L northerly"    1.41
"F. s. of power lines (0.3m. n. of Huntingburg C/L) northerly (N8)" 0.25
1   9059  73  13  2.8   0.00   8.3   0.0   4.8  "6"
"A-4"     1  "SC"     113.1  10.6  16  23.8  15.6   8.2  2.71
 52  2.7  0
3
"03-19-86"  1  1  0  0  1145  1300   42    0    0  44  46
"Dynaflect"
   1  0  1.0  8  0.81  0.67  0.51  0.40  0.26
   2  0  1.0  8  0.60  0.48  0.38  0.30  0.18
   3  0  1.0  8  0.66  0.54  0.42  0.33  0.21
   4  0  1.0  8  0.65  0.53  0.43  0.36  0.23
   5  0  1.0  8  0.72  0.60  0.50  0.40  0.29
   6  0  1.0  8  0.61  0.48  0.39  0.30  0.20
"Road Rater 400"
   1  1  2  0  0.62   25.1    1.10    0.75    0.68    0.51
   1  3  2  0  1.84   25.2    1.71    1.44    0.86    0.89
   2  1  2  0  0.62   25.2    0.69    0.52    0.64    0.34
   2  2  2  0  1.21   25.2    1.06    0.85    0.65    0.51
   2  3  2  0  1.85   25.2    1.36    0.96    1.67    0.63
   3  1  2  0  0.61   25.2    0.75    0.59    0.42    0.37
   3  2  2  0  1.22   25.2    1.12    0.86    0.57    0.49
   3  3  2  0  1.86   25.2    1.52    1.22    0.88    1.03
   4  1  2  0  0.63   25.2    0.73    0.57    0.40    0.35
   4  2  2  0  1.22   25.2    1.08    1.20    0.97    0.54
   4  3  2  0  1.83   25.2    1.33    1.35    0.85    0.76
   5  1  2  0  0.62   25.2    0.66    0.46    0.35    0.33
   5  2  2  0  1.22   25.2    1.04    0.90    0.65    0.54
   5  3  2  0  1.84   25.2    1.43    1.34    1.07    0.74
   6  1  1  0  0.62   15.4    1.01    0.99    0.36    0.44
   6  2  1  0  1.29   15.5    1.35    1.26    0.56    0.59
   6  1  2  0  0.62   25.0    0.54    0.46    0.45    0.20
   6  2  2  0  1.20   25.0    0.92    0.82    0.40    0.40
   6  3  2  0  1.87   25.1    1.30    1.08    0.81    1.04
   6  1  3  0  0.66   35.3    0.71    0.48    0.41    0.20
   6  2  3  0  1.13   35.3    0.85    0.65    0.50    0.33
   6  3  3  0  1.72   35.3    1.17    1.09    0.85    1.37
"04-22-86"  0  0  0  1  1000  1030   50    0    0  40  53
"Dynatest FWD"
   1  2  0  433  167  145  115   89   64    0    0
   1  4  0  916  365  322  259  201  147    0    0
   2  2  0  431  139  113   95   68   49    0    0
   2  4  0  915  318  267  218  161  114    0    0
   3  2  0  425  143  126   93   72   49    0    0
   3  4  0  910  328  290  222  172  121    0    0
   4  2  0  424  135  116   93   68   49    0    0
   4  4  0  909  309  267  214  161  117    0    0
   5  2  0  422  146  129  103   79   57   41   19
   5  4  0  905  338  294  240  185  134   97   48
   6  1  0  189   59   48   34   26   17    0    0
   6  2  0  418  137  113   89   63   45    0    0
   6  3  0  656  219  186  145  104   73    0    0
   6  4  0  898  299  259  201  147  103    0    0
"08-06-86"  1  1  1  1  0925  0950   80   91   84  73  71
"Dynaflect"
   1  0  1.0  8  0.96  0.77  0.55  0.36  0.23
   2  0  1.0  8  0.85  0.67  0.46  0.29  0.17
   3  0  1.0  8  0.85  0.69  0.48  0.28  0.17
   4  0  1.0  8  0.81  0.65  0.46  0.30  0.20
   5  0  1.0  8  1.01  0.82  0.60  0.42  0.30
   6  0  1.0  8  0.78  0.62  0.42  0.28  0.16
"Road Rater 400"
   1  1  2  0  0.61   25.1    0.79    0.66    0.48    0.26
   1  2  2  0  1.21   25.1    1.80    1.53    1.12    0.62
   1  3  2  0  1.80   25.2    3.28    2.91    2.07    7.40
   2  1  2  0  0.59   25.1    0.68    0.42    0.39    0.14
   2  2  2  0  1.22   25.1    1.50    1.05    0.88    0.45
   2  3  2  0  1.79   25.1    2.81    2.98    1.68    1.10
   3  1  2  0  0.60   25.1    0.61    2.01    0.38    3.33
   3  2  2  0  1.22   25.1    1.41    2.01    0.91    2.26
   3  3  2  0  1.81   25.1    2.60    1.90    1.71    1.90
   4  1  2  0  0.59   25.1    0.61    0.65    0.30    0.23
   4  2  2  0  1.21   25.1    1.39    1.08    0.71    0.54
   4  3  2  0  1.81   25.1    2.51    2.30    3.02    1.02
   5  1  2  0  0.60   25.1    0.73    0.56    0.46    0.32
   5  2  2  0  1.21   25.1    1.63    1.53    1.03    0.81
   5  3  2  0  1.81   25.2    2.94    2.72    1.95    1.06
   6  1  1  0  0.61   15.2    0.50    0.43    0.28    0.15
   6  2  1  0  1.23   15.3    1.19    0.98    0.68    0.40
   6  1  2  0  0.61   25.1    0.58    0.50    0.31    0.18
   6  2  2  0  1.21   25.1    1.28    1.28    0.74    0.45
   6  3  2  0  1.82   25.1    2.30    1.58    1.36    0.85
   6  1  3  0  0.60   35.2    0.51    0.40    0.26    0.15
   6  2  3  0  1.17   35.1    2.70    2.47    1.56    0.97
   6  2  3  0  1.41   35.1    3.74    3.99    3.15    1.72
"Road Rater 2000"
   1  1  2  0  0.60   25.1    1.16    0.91    0.69    0.52
   1  2  2  0  1.21   25.1    2.55    2.04    1.53    1.15
   1  3  2  0  1.80   25.1    3.96    3.22    2.38    1.82
   1  4  2  0  2.42   25.1    5.67    4.57    3.39    2.64
   1  5  2  0  3.63   25.1    9.26    7.51    5.57    4.32
   2  1  2  0  0.59   25.1    0.75    0.58    0.40    0.30
   2  2  2  0  1.20   25.1    1.56    1.24    0.86    0.64
   2  3  2  0  1.80   25.1    2.46    1.91    1.36    1.01
   2  4  2  0  2.44   25.1    3.45    2.72    1.91    1.42
   2  5  2  0  3.58   25.1    5.69    4.44    3.31    2.35
   3  1  2  0  0.64   25.1    0.71    0.51    0.38    0.25
   3  2  2  0  1.21   25.1    1.51    1.07    0.78    0.52
   3  3  2  0  1.82   25.0    2.42    1.76    1.29    0.84
   3  4  2  0  2.44   25.1    3.42    2.49    1.80    1.16
   3  5  2  0  3.63   25.1    5.80    4.18    3.01    1.97
   4  1  2  0  0.58   25.1    0.60    0.42    0.27    0.18
   4  2  2  0  1.23   25.1    1.33    0.99    0.64    0.40
   4  3  2  0  1.84   25.1    2.10    1.57    1.01    0.63
   4  4  2  0  2.44   25.1    3.03    2.21    1.45    0.89
   4  5  2  0  3.60   25.1    5.00    3.71    2.45    1.51
   5  1  2  0  0.64   25.1    0.69    0.45    0.37    0.22
   5  2  2  0  1.21   25.1    1.33    0.89    0.62    0.41
   5  3  2  0  1.81   25.1    2.07    1.42    0.89    0.64
   5  4  2  0  2.43   25.1    2.87    2.00    1.25    0.92
   5  5  2  0  3.61   25.1    4.73    3.27    2.14    1.49
   6  1  2  0  0.62   25.1    0.81    0.56    0.43    0.30
   6  2  2  0  1.19   25.1    1.63    1.17    0.85    0.60
   6  3  2  0  1.75   25.1    2.51    1.86    1.35    0.92
   6  4  2  0  2.41   25.1    3.58    2.66    1.95    1.37
   6  5  2  0  3.57   25.1    5.91    4.38    3.25    2.24
   7  1  1  0  0.59   15.2    0.55    0.40    0.29    0.19
   7  2  1  0  1.21   15.2    1.17    0.87    0.62    0.38
   7  3  1  0  1.78   15.1    1.93    1.39    1.01    0.61
   7  4  1  0  2.35   15.1    2.76    2.02    1.46    0.86
   7  5  1  0  3.64   15.2    4.49    3.48    2.49    1.47
   7  1  2  0  0.62   25.1    0.53    0.41    0.24    0.18
   7  2  2  0  1.22   25.1    1.16    0.85    0.52    0.37
   7  3  2  0  1.77   25.1    1.79    1.33    0.85    0.59
   7  4  2  0  2.45   25.0    2.60    1.97    1.28    0.85
   7  5  2  0  3.60   25.0    4.29    3.19    2.14    1.37
   7  1  3  0  0.59   35.2    0.57    0.40    0.28    0.19
   7  2  3  0  1.23   35.1    1.23    0.88    0.54    0.37
   7  3  3  0  1.79   35.2    1.95    1.38    0.86    0.59
   7  4  3  0  2.42   35.2    2.80    2.00    1.24    0.86
   7  5  3  0  3.62   35.1    4.86    3.31    2.15    1.45
"Dynatest FWD"
   1  2  0  397  305  239  178  108   71   45   26
   1  4  0  840  702  561  422  268  174  111   58
   2  2  0  396  332  261  180  106   59    0    0
   2  4  0  834  763  614  428  264  148    0    0
   3  2  0  392  296  248  168   99   54   29   13
   3  4  0  837  713  593  414  254  145   79   36
   4  2  0  396  258  208  144   89   49    0    0
   4  4  0  839  606  496  349  221  128    0    0
   5  2  0  394  329  269  186  118   71   44   20
   5  4  0  830  752  620  440  289  182  110   50
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  393  266  208  138   78   44    0    0
   6  3  0  613  435  343  230  135   75    0    0
   6  4  0  844  609  483  328  196  107    0    0



"V8"   77  "SR"  154   1850  11.5    213  "S"
"F. 2.2m. w. of SR63 to 3.0m. e. of SR63 (except Graysville)"       4.95
"F. 0.75m. e. of SR63 easterly (WB)"    0.25
1   9479  73  13  1.9   0.00   4.9   0.0   5.0  "G"
"A-7-6"  19  "CH"      96.1  27.0   5  54.5  24.1  30.4  2.72
 77  3.2  0
3
"03-17-86"  1  0  0  0  1400  1430  102    0    0  60  45
"Dynaflect"
   1  0  1.0  8  1.65  1.23  0.84  0.61  0.40
   2  0  1.0  8  1.23  0.95  0.65  0.48  0.31
   3  0  1.0  8  1.12  0.90  0.68  0.53  0.36
   4  0  1.0  8  1.01  0.74  0.54  0.43  0.30
   5  0  1.0  8  1.09  0.88  0.66  0.51  0.34
   6  0  1.0  8  0.73  0.56  0.39  0.31  0.19
"04-18-86"  0  1  1  1  0815  0845   54    0    0  57  49
"Road Rater 400"
   1  1  2  0  0.56   24.6    1.13    1.26    0.59    1.01
   1  2  2  0  1.23   25.0    2.37    2.86    1.27    1.71
   1  3  2  0  1.83   25.2    4.68    4.22    2.58    3.22
   2  1  2  0  0.57   24.5    0.72    0.55    0.26    0.25
   2  2  2  0  1.26   25.5    1.81    1.82    1.12    0.70
   2  3  2  0  1.86   25.0    3.38    2.82    2.04    2.37
   3  1  2  0  0.57   24.5    0.61    1.63    0.40    0.57
   3  2  2  0  1.25   25.4    1.54    1.17    1.00    0.70
   3  3  2  0  1.87   25.3    3.25    2.91    2.15    3.20
   4  1  2  0  0.59   24.7    0.56    0.54    0.36    0.15
   4  2  2  0  1.22   25.0    1.35    1.71    0.62    0.48
   4  3  2  0  1.87   24.8    2.50    3.03    1.41    2.22
   5  1  2  0  0.58   24.6    0.56    1.16    0.34    0.23
   5  2  2  0  1.19   24.7    1.28    1.75    0.87    0.62
   5  3  2  0  1.75   24.7    2.45    2.65    1.63    1.16
   6  1  1  0  0.63   15.4    0.56    0.49    0.37    0.49
   6  2  1  0  1.24   15.3    1.27    1.10    0.79    1.16
   6  1  2  0  0.60   24.9    0.53    0.92    0.32    0.69
   6  2  2  0  1.23   25.0    1.23    1.22    0.84    0.69
   6  3  2  0  1.79   24.9    2.33    2.62    1.64    2.23
   6  1  3  0  0.58   35.2    0.36    0.39    0.19    0.10
   6  2  3  0  1.18   35.1    0.84    2.05    0.54    1.36
   6  3  3  0  1.79   35.2    1.79    1.86    5.10    0.84
"Road Rater 2000"
```

```
   1  1  2  0  0.59   25.1    0.80    0.58    0.42    0.30
   1  2  2  0  1.20   25.1    1.94    1.37    0.97    0.71
   1  3  2  0  1.78   25.0    3.17    2.27    1.56    1.13
   1  4  2  0  2.42   25.1    4.56    3.23    2.21    1.56
   1  5  2  0  3.60   25.1    7.70    5.32    3.59    2.47
   2  1  2  0  0.65   25.1    0.78    0.58    0.42    0.30
   2  2  2  0  1.21   25.1    1.55    1.16    0.85    0.60
   2  3  2  0  1.83   25.0    2.48    1.78    1.30    0.91
   2  4  2  0  2.40   25.1    3.52    2.47    1.80    1.26
   2  5  2  0  3.57   25.1    5.67    3.81    2.84    1.95
   3  1  2  0  0.63   25.1    0.78    0.52    0.42    0.32
   3  2  2  0  1.20   25.0    1.51    1.04    0.84    0.62
   3  3  2  0  1.75   25.1    2.38    1.65    1.29    0.96
   3  4  2  0  2.40   25.1    3.30    2.27    1.78    1.31
   3  5  2  0  3.60   25.0    5.37    3.60    2.81    2.06
   4  1  2  0  0.63   25.0    0.56    0.38    0.32    0.24
   4  2  2  0  1.22   25.1    1.15    0.79    0.66    0.49
   4  3  2  0  1.76   25.1    1.74    1.21    0.98    0.75
   4  4  2  0  2.42   25.2    2.44    1.67    1.36    1.03
   4  5  2  0  3.60   25.1    3.81    2.68    2.13    1.62
   5  1  2  0  0.60   25.1    0.58    0.45    0.35    0.25
   5  2  2  0  1.22   25.2    1.38    0.94    0.75    0.54
   5  3  2  0  1.77   25.2    2.11    1.45    1.14    0.82
   5  4  2  0  2.41   25.2    2.99    2.05    1.59    1.14
   5  5  2  0  3.59   25.1    4.79    3.24    2.50    1.77
   6  1  1  0  0.58   15.0    0.44    0.32    0.27    0.20
   6  2  1  0  1.22   15.0    1.02    0.79    0.62    0.45
   6  3  1  0  1.86   15.1    1.69    1.32    0.99    0.74
   6  4  1  0  2.37   15.1    2.37    1.85    1.44    1.05
   6  5  1  0  3.56   15.0    3.71    2.87    2.28    1.54
   6  1  2  0  0.64   25.1    0.58    0.45    0.38    0.31
   6  2  2  0  1.24   25.1    1.21    0.95    0.81    0.64
   6  3  2  0  1.80   25.0    1.87    1.46    1.24    0.97
   6  4  2  0  2.39   25.1    2.55    1.99    1.66    1.32
   6  5  2  0  3.59   25.1    3.93    3.07    2.53    2.00
   6  1  3  0  0.62   35.1    0.31    0.22    0.18    0.14
   6  2  3  0  1.23   35.1    0.87    0.61    0.49    0.36
   6  3  3  0  1.78   35.1    1.35    0.93    0.74    0.54
   6  4  3  0  2.40   35.1    1.89    1.31    1.03    0.75
   6  5  3  0  3.61   35.1    2.93    2.08    1.61    1.18
"Dynatest FWD"
   1  2  0  401  403  289  175  116   80    0    0
   1  4  0  871  821  594  371  243  166    0    0
   2  2  0  415  275  209  140   88   62    0    0
   2  4  0  881  571  437  294  194  133    0    0
   3  2  0  416  246  207  146  103  071    0    0
   3  4  0  891  546  429  312  219  151    0    0
   4  2  0  416  194  150  113   79   59    0    0
   4  4  0  947  405  318  237  171  125    0    0
   5  2  0  412  217  186  136   96   66   48   31
   5  4  0  867  485  393  289  203  140  102   32
   6  1  0  173   75   55   43   28   22    0    0
   6  2  0  411  180  141  101   71   51    0    0
   6  3  0  644  280  218  156  115   79    0    0
   6  4  0  872  373  298  211  152  106    0    0
"08-05-86"  1  1  1  1  0900  0940   79   88   94  75  68
"Dynaflect"
   1  0  1.0  8  1.27  0.97  0.69  0.48  0.34
   2  0  1.0  8  0.96  0.75  0.53  0.36  0.25
   3  0  1.0  8  1.02  0.82  0.60  0.43  0.30
   4  0  1.0  8  0.76  0.61  0.47  0.35  0.26
   5  0  1.0  8  0.98  0.79  0.59  0.42  0.29
   6  0  1.0  8  0.67  0.51  0.37  0.26  0.18
"Road Rater 400"
   1  1  2  0  0.60   25.0    0.95    0.82    0.51    0.23
   1  2  2  0  1.21   25.0    2.34    1.83    1.24    0.67
   1  3  2  0  1.81   25.1    5.13    3.88    2.52    1.74
   2  1  2  0  0.59   25.0    0.80    0.58    0.41    0.29
   2  2  2  0  1.20   25.0    1.94    1.40    0.99    0.69
   2  3  2  0  1.79   25.0    4.17    2.82    2.40    1.93
   3  1  2  0  0.59   25.0    0.72    0.59    0.44    0.30
   3  2  2  0  1.20   25.0    1.78    1.41    1.06    0.69
   3  3  2  0  1.80   25.0    3.50    2.05    1.36    0.52
   4  1  2  0  0.59   25.0    0.55    0.40    0.29    0.16
   4  2  2  0  1.19   25.0    1.31    1.03    0.72    0.45
   4  3  2  0  1.80   25.1    2.65    2.65    1.39    0.98
   5  1  2  0  0.59   25.0    0.67    0.53    0.37    0.24
   5  2  2  0  1.21   25.0    1.67    1.39    0.96    0.65
   5  3  2  0  1.81   25.0    3.12    2.96    1.69    1.04
   6  1  1  0  0.59   15.0    0.52    0.38    0.28    0.40
   6  2  1  0  1.20   15.1    1.40    1.35    0.76    0.55
   6  1  2  0  0.59   25.0    0.67    0.51    0.42    0.18
   6  2  2  0  1.21   25.0    1.62    1.34    1.03    0.62
   6  3  2  0  1.81   25.0    3.10    2.61    1.92    1.52
   6  1  3  0  0.60   35.0    0.45    0.34    0.24    0.12
   6  2  3  0  1.20   35.0    1.09    0.83    0.60    0.33
   6  3  3  0  1.77   35.0    3.18    2.67    4.89    3.42
"Road Rater 2000"
   1  1  2  0  0.59   25.1    1.02    0.68    0.45    0.34
   1  2  2  0  1.20   25.2    2.30    1.47    0.95    0.71
   1  3  2  0  1.82   25.1    3.79    2.40    1.50    1.10
   1  4  2  0  2.42   25.1    5.53    3.43    2.27    1.51
   1  5  2  0  3.62   25.2    9.51    5.72    3.64    2.41
   2  1  2  0  0.60   25.2    0.76    0.54    0.39    0.28
   2  2  2  0  1.22   25.1    1.61    1.13    0.83    0.58
   2  3  2  0  1.80   25.1    2.53    1.78    1.26    0.88
   2  4  2  0  2.41   25.1    3.59    2.49    1.74    1.20
   2  5  2  0  3.57   25.1    5.92    4.04    2.76    1.86
   3  1  2  0  0.61   25.1    0.84    0.55    0.42    0.31
   3  2  2  0  1.23   25.2    1.77    1.20    0.90    0.64
   3  3  2  0  1.79   25.1    2.69    1.79    1.34    0.96
   3  4  2  0  2.39   25.2    3.75    2.51    1.86    1.31
   3  5  2  0  3.57   25.1    6.15    4.08    2.97    2.06
   4  1  2  0  0.60   25.2    0.50    0.37    0.29    0.22
   4  2  2  0  1.24   25.2    1.13    0.79    0.59    0.45
   4  3  2  0  1.83   25.1    1.73    1.23    0.90    0.67
   4  4  2  0  2.44   25.1    2.37    1.66    1.22    0.91
   4  5  2  0  3.60   25.1    4.00    2.68    1.91    1.43
   5  1  2  0  0.59   25.1    0.65    0.48    0.35    0.26
   5  2  2  0  1.18   25.2    1.41    1.02    0.73    0.53
   5  3  2  0  1.83   25.1    2.32    1.70    1.17    0.85
   5  4  2  0  2.41   25.1    3.20    2.32    1.60    1.15
   5  5  2  0  3.62   25.2    5.18    3.72    2.54    1.79
   6  1  1  0  0.63   15.1    0.59    0.39    0.30    0.22
   6  2  1  0  1.22   15.1    1.27    0.83    0.57    0.45
   6  3  1  0  1.81   15.0    1.97    1.30    0.92    0.67
   6  4  1  0  2.41   15.0    2.79    1.87    1.28    0.96
   6  5  1  0  3.59   15.1    4.53    2.95    2.22    1.54
   6  1  2  0  0.57   25.1    0.69    0.47    0.38    0.31
   6  2  2  0  1.21   25.1    1.51    1.01    0.80    0.66
   6  3  2  0  1.80   25.1    2.24    1.53    1.18    0.97
   6  4  2  0  2.41   25.1    3.09    2.14    1.63    1.33
   6  5  2  0  3.63   25.1    4.97    3.42    2.61    2.07
   6  1  3  0  0.63   35.1    0.57    0.33    0.24    0.20
   6  2  3  0  1.24   35.1    1.12    0.68    0.45    0.38
   6  3  3  0  1.82   35.1    1.71    1.06    0.64    0.58
   6  4  3  0  2.42   35.1    2.34    1.46    0.84    0.79
   6  5  3  0  3.64   35.1    3.87    2.34    1.45    1.21
"Dynatest FWD"
   1  2  0  386  437  176  167  107   73    0    0
   1  4  0  832  929  368  373  234  161    0    0
   2  2  0  385  324  200  137   86   58    0    0
   2  4  0  835  675  340  296  186  126    0    0
   3  2  0  386  311  155  153  102   70    0    0
   3  4  0  834  656  382  332  222  150    0    0
   4  2  0  384  229  126  114   77   56    0    0
   4  4  0  835  489  318  246  168  119    0    0
   5  2  0  379  264  186  140   93   63   48   29
   5  4  0  830  581  335  319  206  138  101   56
   6  1  0  151   73   85   30   25   12    0    0
   6  2  0  379  220  111  101   67   46    0    0
   6  3  0  598  337  170  159  110   73    0    0
   6  4  0  837  456  218  220  151  103    0    0



"V9"   87  " I"   64   7910  37.0   2927  "S"
"F. SR61 to Warrick/Spencer CL"   14.58
"Betw. MP 47&48, about 8.0m. e. of SR61 (EB)"    0.25
1   9581  75  11  3.0   0.00  13.0   0.0   0.0  "N"
"A-7-6"  13  "CL"     115.2  16.8   9  41.5  19.9  21.6  2.75
 58  3.2  0
4
"03-18-86"  1  0  0  0  1115  1145   75    0    0  62  52
"Dynaflect"
   1  0  1.0  8  0.39  0.30  0.23  0.21  0.14
   2  0  1.0  8  0.35  0.27  0.23  0.21  0.14
   3  0  1.0  8  0.37  0.29  0.25  0.23  0.16
   4  0  1.0  8  0.39  0.31  0.26  0.24  0.17
   5  0  1.0  8  0.38  0.30  0.25  0.24  0.18
   6  0  1.0  3  0.36  0.29  0.25  0.24  0.18
"04-18-86"  0  1  0  1  1300  1330   87    0    0  70  47
"Road Rater 400"
   1  1  2  0  0.61    25.1    0.22    0.95    0.13    0.63
   1  2  2  0  1.24    25.1    0.47    1.63    0.34    0.84
   1  3  2  0  1.83    25.2    0.71    2.34    0.56    2.24
   2  1  2  0  0.62    25.4    0.22    0.11    0.12    0.10
   2  2  2  0  1.21    24.9    0.46    0.26    0.30    0.24
   2  3  2  0  1.77    25.0    0.75    0.40    0.47    0.46
   3  1  2  0  0.60    25.3    0.22    0.18    0.16    0.11
   3  2  2  0  1.25    25.4    0.48    0.43    0.37    0.28
   3  3  2  0  1.87    25.4    0.78    0.72    0.62    0.50
   4  1  2  0  0.61    25.2    0.19    0.20    0.11    0.05
   4  2  2  0  1.24    25.2    0.43    1.77    0.30    0.21
   4  3  2  0  1.85    25.2    0.68    2.45    0.50    0.37
   5  1  2  0  0.60    25.1    0.18    0.13    0.09    0.50
   5  2  2  0  1.24    25.2    0.35    0.29    0.23    1.38
   5  3  2  0  1.83    25.2    0.56    0.39    0.41    1.15
   6  1  1  0  0.63    15.2    0.22    0.17    0.15    0.09
   6  2  1  0  1.25    15.3    0.44    0.34    0.20    0.23
   6  1  2  0  0.62    25.3    0.17    0.09    0.10    0.06
   6  2  2  0  1.25    25.3    0.36    1.66    0.24    0.18
   6  3  2  0  1.85    25.3    0.57    1.39    1.08    0.34
   6  1  3  0  0.58    35.4    0.13    0.09    0.05    0.06
   6  2  3  0  1.20    35.4    0.34    0.29    0.13    0.16
   6  3  3  0  1.84    35.4    0.65    0.56    0.39    0.37
"Dynatest FWD"
   1  2  0  390   74   60   47   36   28    0    0
   1  4  0  851  161  129  102   80   62    0    0
   2  2  0  386   89   70   54   38   31    0    0
   2  4  0  825  190  151  116   87   68    0    0
   3  2  0  385   77   63   52   43   32    0    0
   3  4  0  827  167  136  113   92   71    0    0
   4  2  0  385   76   59   49   39   29    0    0
   4  4  0  825  161  130  109   97   66    0    0
   5  2  0  382   63   51   45   37   30   25   17
   5  4  0  821  134  112   98   81   65   53   33
   6  1  0  176   34   22   21   14   13    0    0
   6  2  0  379   65   50   44   34   28    0    0
   6  3  0  602  102   83   69   57   45    0    0
   6  4  0  835  136  112   95   78   62    0    0
"08-15-86"  1  1  1  0  0855  0918   88   90    0  76  70
"Dynaflect"
   1  0  1.0  8  0.41  0.32  0.25  0.17  0.13
   2  0  1.0  8  0.50  0.50  0.28  0.19  0.13
   3  0  1.0  8  0.44  0.36  0.29  0.21  0.15
   4  0  1.0  8  0.45  0.38  0.29  0.21  0.15
   5  0  1.0  9  0.39  0.34  0.29  0.22  0.17
   6  0  1.0  8  0.39  0.34  0.28  0.22  0.17
```

```
"Road Rater 400"
   1  1  2  0  0.60   25.0    0.30    0.27    0.21    0.15
   1  2  2  0  1.25   25.1    0.72    0.65    0.52    0.39
   1  3  2  0  1.81   25.1    1.08    1.27    0.80    0.61
   2  1  2  0  0.60   25.0    0.40    0.33    0.23    0.17
   2  2  2  0  1.23   25.1    0.96    0.82    0.41    0.39
   2  3  2  0  1.83   25.1    1.50    1.30    1.22    0.62
   3  1  2  0  0.60   25.0    0.30    0.27    0.14    0.15
   3  1  2  0  0.60   25.1    0.31    0.27    0.16    0.16
   3  2  2  0  1.24   25.1    0.74    0.66    0.43    0.39
   3  3  2  0  1.85   25.1    1.12    1.03    0.81    0.50
   4  1  2  0  0.59   25.0    0.29    0.25    0.18    0.12
   4  2  2  0  1.22   25.1    0.81    0.72    0.54    0.37
   4  3  2  0  1.85   25.1    1.23    1.11    0.84    0.58
   5  1  2  0  0.59   25.0    0.23    0.15    0.17    0.12
   5  2  2  0  1.24   25.1    0.55    0.50    0.41    0.31
   5  3  2  0  1.83   25.1    0.78    0.71    0.59    0.46
   6  1  1  0  0.60   15.0    0.22    0.20    0.17    0.13
   6  2  1  0  1.21   15.0    0.52    0.47    0.40    0.31
   6  1  2  0  0.60   24.9    0.21    0.18    0.15    0.10
   6  2  2  0  1.22   24.9    0.52    0.47    0.39    0.29
   6  3  2  0  1.82   25.0    0.78    0.73    0.60    0.46
   6  1  3  0  0.59   35.1    0.22    0.19    0.14    0.10
   6  2  3  0  1.20   35.1    0.56    0.52    0.41    0.30
   6  3  3  0  1.80   35.1    0.94    0.86    0.70    0.52
"Road Rater 2000"
   1  1  2  0  0.62   24.8    0.42    0.22    0.22    0.14
   1  2  2  0  1.21   24.9    0.86    0.46    0.36    0.29
   1  3  2  0  1.84   24.9    1.39    0.72    0.52    0.45
   1  4  2  0  2.38   24.9    1.83    0.94    0.67    0.61
   1  5  2  0  3.59   24.9    2.82    1.46    1.09    0.94
   2  1  2  0  0.64   24.9    0.53    0.25    0.18    0.14
   2  2  2  0  1.23   24.9    1.09    0.55    0.37    0.28
   2  3  2  0  1.82   24.9    1.65    0.84    0.58    0.43
   2  4  2  0  2.39   24.9    2.30    1.16    0.78    0.59
   2  5  2  0  3.57   24.8    3.68    1.84    1.25    0.91
   3  1  2  0  0.58   25.2    0.35    0.20    0.16    0.12
   3  2  2  0  1.19   25.2    0.79    0.48    0.37    0.31
   3  3  2  0  1.84   25.2    1.25    0.75    0.59    0.46
   3  4  2  0  2.42   25.2    1.69    1.03    0.80    0.62
   3  5  2  0  3.61   25.2    2.71    1.58    1.27    0.97
   4  1  2  0  0.62   25.0    0.29    0.20    0.16    0.12
   4  2  2  0  1.21   25.0    0.63    0.45    0.35    0.26
   4  3  2  0  1.84   25.0    0.99    0.68    0.53    0.39
   4  4  2  0  2.43   25.1    1.34    0.94    0.73    0.54
   4  5  2  0  3.57   25.1    2.04    1.42    1.11    0.82
   5  1  2  0  0.60   25.0    0.23    0.15    0.14    0.11
   5  2  2  0  1.16   25.0    0.50    0.35    0.28    0.21
   5  3  2  0  1.83   25.0    0.82    0.55    0.46    0.35
   5  4  2  0  2.42   25.0    1.10    0.75    0.62    0.48
   5  5  2  0  3.62   25.0    1.69    1.15    0.96    0.73
   6  1  1  0  0.57   14.9    0.38    0.25    0.23    0.16
   6  2  1  0  1.20   15.0    0.76    0.57    0.51    0.33
   6  3  1  0  1.76   14.9    1.11    0.81    0.72    0.49
   6  4  1  0  2.44   15.0    1.54    1.13    0.95    0.65
   6  5  1  0  3.60   14.9    2.59    1.62    1.38    1.01
   6  1  2  0  0.60   25.1    0.33    0.22    0.16    0.14
   6  2  2  0  1.22   25.0    0.69    0.42    0.30    0.22
   6  3  2  0  1.77   25.0    0.99    0.62    0.45    0.33
   6  4  2  0  2.40   25.0    1.37    0.85    0.62    0.46
   6  5  2  0  3.59   25.1    2.18    1.34    0.94    0.69
   6  1  3  0  0.63   35.1    0.33    0.20    0.14    0.11
   6  2  3  0  1.20   34.8    0.66    0.41    0.27    0.19
   6  3  3  0  1.83   34.8    1.02    0.63    0.42    0.30
   6  4  3  0  2.44   35.1    1.45    0.90    0.58    0.41
   6  5  3  0  3.61   35.1    2.35    1.45    0.87    0.62
"11-18-86"  0  0  0  1  1350  1413   45   47   47  53  32
"Dynatest FWD"
   1  2  0  406   56   47   39   30   23   19   13
   1  4  0  897  125  105   85   69   54   44   28
```

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  2  2  0  418   67   52   42   32   26    0    0
  2  4  0  894  149  119   96   75   59    0    0
  3  2  0  417   55   49   41   34   28   23   13
  3  4  0  893  126  110   94   77   64   51   33
  4  2  0  419   53   45   39   31   26    0    0
  4  4  0  891  120  102   87   72   59    0    0
  5  2  0  417   47   41   34   29   25   21   13
  5  4  0  887  107   93   80   68   56   47   31
  6  1  0    0    0    0    0    0    0    0    0
  6  2  0  416   48   40   37   30   25    0    0
  6  3  0  628   79   66   61   49   43    0    0
  6  4  0  887  107   92   80   69   57    0    0



"V10"  62  " I"   64   7870  32.0   2518  "S"
"F. Perry/Dubois CL to 0.4m. e. of SR145"    5.64
"F. 0.5m. e. of Perry/Dubois CL (betw. MP 67&68) (EB)"         0.25
1   9512  76  10  2.9   0.00  13.4   0.0   0.0  "N"
"A-4"     7  "CL"      110.3  14.4  12  23.6  15.0   8.6  2.68
 59  3.2  0
4
"03-18-86"  1  0  0  0  1245  1315   70    0    0  60  47
"Dynaflect"
   1  0  1.0  8  0.42  0.34  0.36  0.29  0.23
   2  0  1.0  8  0.47  0.38  0.43  0.33  0.27
   3  0  1.0  8  0.44  0.37  0.33  0.33  0.27
   4  0  1.0  8  0.44  0.37  0.33  0.34  0.27
   5  0  1.0  8  0.44  0.36  0.32  0.33  0.27
   6  0  1.0  8  0.50  0.42  0.37  0.38  0.31
"04-18-86"  0  1  0  1  1445  1515   94    0    0  73  56
"Road Rater 400"
   1  1  2  0  0.65   25.7    0.20    0.22    1.31    0.07
   1  2  2  0  1.25   25.4    0.40    1.17    0.27    1.28
   1  3  2  0  1.89   25.5    0.63    0.80    0.67    1.55
   2  1  2  0  0.60   25.2    0.19    0.16    0.13    0.03
   2  2  2  0  1.23   25.2    0.43    0.37    0.31    0.07
   2  3  2  0  1.85   25.3    0.70    0.58    0.51    0.31
   3  1  2  0  0.60   25.2    0.16    0.08    0.71    0.12
   3  2  2  0  1.24   25.3    0.36    0.24    1.33    0.47
   3  3  2  0  1.86   25.3    0.57    0.52    0.41    1.71
   4  2  2  0  1.24   25.3    0.36    0.31    0.35    0.08
   4  3  2  0  1.87   25.3    0.57    0.50    0.41    0.80
   4  3  2  0  1.83   25.2    0.57    0.49    0.42    0.76
   5  1  2  0  0.61   25.2    0.24    0.20    0.36    0.27
   5  2  2  0  1.24   25.2    0.36    0.25    1.04    0.39
   5  3  2  0  1.86   25.3    0.57    0.30    2.29    0.71
   6  1  1  0  0.61   15.2    0.21    0.15    0.14    0.11
   6  2  1  0  1.22   15.2    0.39    0.34    0.22    0.21
   6  1  2  0  0.60   25.1    0.18    0.14    0.14    0.20
   6  2  2  0  1.23   25.1    0.38    0.32    0.20    0.11
   6  3  2  0  1.84   25.2    0.60    0.51    1.50    1.47
   6  1  3  0  0.58   35.1    0.13    0.09    0.11    0.09
   6  2  3  0  1.17   35.1    0.29    0.23    0.31    0.26
   6  3  3  0  1.79   35.2    0.54    0.46    0.23    0.44
"Dynatest FWD"
   1  2  0  400   67   53   49   41   33    0    0
   1  4  0  853  156  127  111   92   74    0    0
   2  2  0  397   84   70   59   50   41    0    0
   2  4  0  850  184  157  135  111   91    0    0
   3  2  0  394   67   56   47   41   33    0    0
   3  4  0  845  143  119  101   86   69    0    0
   4  2  0  396   67   57   49   41   35    0    0
   4  4  0  842  140  118  101   87   72    0    0
   5  2  0  392   65   50   46   38   31   28   20
   5  4  0  846  138  109   96   79   65   56   37
   6  1  0  194   29   29   24   19   15    0    0
   6  2  0  399   66   57   47   39   32    0    0
   6  3  0  614  105   90   75   62   51    0    0
   6  4  0  848  150  123  101   84   69    0    0
"08-15-86"  1  1  1  0  1047  1100  100  102    0  82  72
"Dynaflect"
   1  0  1.0  8  0.43  0.37  0.32  0.26  0.22
   2  0  1.0  8  0.48  0.41  0.35  0.28  0.23
   3  0  1.0  8  0.48  0.42  0.37  0.31  0.26
   4  0  1.0  8  0.49  0.44  0.39  0.34  0.29
   5  0  1.0  8  0.48  0.43  0.38  0.33  0.29
   6  0  1.0  8  0.51  0.45  0.40  0.35  0.30
"Road Rater 400"
   1  1  2  0  0.57   25.1    0.21    0.16    0.12    0.11
   1  2  2  0  1.24   25.1    0.51    0.45    0.35    0.26
   1  3  2  0  1.82   25.1    0.78    0.69    0.55    0.42
   2  1  2  0  0.60   25.0    0.23    0.19    0.14    0.10
   2  2  2  0  1.23   25.1    0.57    0.50    0.39    0.29
   2  3  2  0  1.83   25.1    0.89    0.78    0.61    0.46
   3  1  2  0  0.60   25.1    0.23    0.18    0.15    0.12
   3  2  2  0  1.23   25.1    0.51    0.44    0.36    0.27
   3  3  2  0  1.83   25.1    0.75    0.67    0.54    0.41
   4  1  2  0  0.59   25.1    0.21    0.18    0.16    0.11
   4  2  2  0  1.23   25.1    0.48    0.42    0.16    0.28
   4  3  2  0  1.84   25.1    0.75    0.67    0.46    0.45
   5  1  2  0  0.59   25.1    0.21    0.18    0.15    0.11
   5  2  2  0  1.24   25.1    0.49    0.44    0.36    0.28
   5  3  2  0  1.84   25.1    0.73    0.66    0.54    0.42
   6  1  1  0  0.63   15.1    0.25    0.26    0.25    0.12
   6  2  1  0  1.16   14.9    0.48    0.56    0.63    0.25
   6  1  2  0  0.60   24.9    0.23    0.14    0.08    0.10
   6  2  2  0  1.23   25.0    0.52    0.39    0.24    0.26
   6  3  2  0  1.83   25.0    0.77    0.61    0.36    0.41
   6  1  3  0  0.58   35.0    0.19    0.13    0.10    0.09
   6  2  3  0  1.15   35.0    0.50    0.20    0.30    0.23
   6  3  3  0  1.78   35.0    0.80    0.68    0.50    0.40
"Road Rater 2000"
   1  1  2  0  0.59   24.9    0.35    0.17    0.15    0.15
   1  2  2  0  1.18   24.9    0.72    0.35    0.28    0.22
   1  3  2  0  1.82   24.9    1.13    0.54    0.44    0.34
   1  4  2  0  2.37   24.9    1.50    0.72    0.59    0.45
   1  5  2  0  3.59   24.9    2.48    1.13    0.92    0.70
   2  1  2  0  0.62   25.0    0.30    0.19    0.15    0.13
   2  2  2  0  1.18   25.0    0.59    0.39    0.30    0.22
   2  3  2  0  1.80   25.0    0.93    0.62    0.48    0.36
   2  4  2  0  2.40   25.0    1.30    0.85    0.67    0.50
   2  5  2  0  3.63   25.0    2.08    1.39    1.09    0.83
   3  1  2  0  0.63   25.0    0.28    0.19    0.15    0.14
   3  2  2  0  1.20   25.0    0.51    0.39    0.31    0.24
   3  3  2  0  1.82   25.0    0.78    0.55    0.44    0.34
   3  4  2  0  2.38   25.1    1.05    0.72    0.59    0.45
   3  5  2  0  3.63   25.0    1.62    1.15    0.89    0.70
   4  1  2  0  0.59   25.0    0.32    0.19    0.16    0.16
   4  2  2  0  1.16   25.0    0.63    0.37    0.31    0.24
   4  3  2  0  1.81   25.0    0.99    0.55    0.46    0.36
   4  4  2  0  2.44   25.0    1.33    0.78    0.62    0.50
   4  5  2  0  3.59   25.0    2.09    1.23    0.95    0.78
   5  1  2  0  0.58   25.0    0.30    0.16    0.16    0.15
   5  2  2  0  1.22   25.0    0.64    0.35    0.29    0.23
   5  3  2  0  1.82   25.0    0.99    0.55    0.55    0.53
   5  4  2  0  2.41   25.0    1.31    0.71    0.60    0.48
   5  5  2  0  3.58   25.0    2.09    1.08    0.90    0.70
   6  1  1  0  0.60   15.0    0.34    0.21    0.17    0.14
   6  2  1  0  1.21   15.1    0.65    0.40    0.34    0.27
   6  3  1  0  1.77   15.0    1.03    0.61    0.51    0.40
   6  4  1  0  2.38   15.0    1.37    0.87    0.68    0.54
   6  5  1  0  3.58   15.0    2.67    1.28    1.05    0.84
   6  1  2  0  0.61   25.1    0.32    0.18    0.16    0.13
   6  2  2  0  1.18   25.1    0.58    0.36    0.29    0.23
   6  3  2  0  1.78   25.1    0.90    0.56    0.46    0.35
   6  4  2  0  2.43   25.1    1.26    0.75    0.61    0.47
   6  5  2  0  3.62   25.1    2.05    1.14    0.93    0.72
   6  1  3  0  0.62   34.9    0.27    0.16    0.14    0.14
   6  2  3  0  1.22   34.9    0.55    0.30    0.24    0.18
   6  3  3  0  1.79   35.0    0.83    0.44    0.35    0.26
   6  4  3  0  2.40   35.0    1.16    0.60    0.48    0.35
   6  5  3  0  3.62   35.0    1.88    0.92    0.72    0.53
"11-18-86"  0  0  0  1  1503  1526   39   43   45  53  29
"Dynatest FWD"
   1  2  0  415   47   42   37   31   25   25   15
   1  4  0  899  113  100   86   74   61   55   34
   2  2  0  417   55   51   46   37   31    0    0
   2  4  0  885  130  118  109   88   74    0    0
   3  2  0  419   44   40   37   32   25   25   13
   3  4  0  877  103   91   80   68   59   51   34
   4  2  0  417   46   42   42   31   28    0    0
   4  4  0  870   98   92   92   68   61    0    0
   5  2  0  416   43   41   35   30   24   23   13
   5  4  0  858   96   86   78   65   57   48   35
   6  1  0    0    0    0    0    0    0    0    0
   6  2  0  416   46   49   43   29   26    0    0
   6  3  0  634   77   73   64   51   44    0    0
   6  4  0  865  105   94   84   69   61    0    0
```

APPENDIX D - CONDITION SURVEY FORMS

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ____________ SECTION C-8

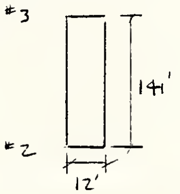
DATE Aug 12, 1986 SAMPLE UNIT ____________

SURVEYED BY ____________ AREA OF SAMPLE ____________

Distress Types

1. *Alligator Cracking*
2. *Bleeding*
3. *Block Cracking*
4. **Bumps and Sags*
5. *Corrugation*
6. *Depression*
7. **Edge Cracking*
8. **Jt Reflection Cracking*
9. **Lane/Shldr Drop Off*
10. **Long & Trans Cracking*
11. *Patching & Util Cut Patching*
12. *Polished Aggregate*
13. **Potholes*
14. *Railroad Crossing*
15. *Rutting*
16. *Shoving*
17. *Slippage Cracking*
18. *Swell*
19. *Weathering and Raveling*

SKETCH:



		EXISTING DISTRESS TYPES				
	10					
	6 = L					
	15 = L					
	20 = L					
TOTAL SEVERITY L	41					
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	2.4	L	6
DEDUCT TOTAL			6
CORRECTED DEDUCT VALUE (CDV)			6

PCI = 100 - CDV = 94

RATING = ____________

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH 114

DATE Aug 26 '86

SURVEYED BY UNDLY

SECTION F-13

SAMPLE UNIT

AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

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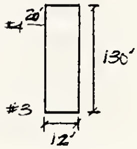

		EXISTING DISTRESS TYPES					
		7	10	15	12		
		9'=L	90'=L	1'×100=L			
			6'=M				
			72'=L				
			15'=M				
			11'=L				
			73'=L				
			27=L				
TOTAL SEVERITY	L	9	273	100			
	M		21				
	H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	0.6	L	3
10	17.5	L	22
10	1.3	M	10
15	6.4	L	23
DEDUCT TOTAL			58
CORRECTED DEDUCT VALUE (CDV)			36

PCI = 100 - CDV = 64

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 27
SECTION F-14
DATE 8/28/86
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

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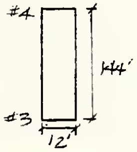

EXISTING DISTRESS TYPES

	7	10				
	36 = L	79 = L				
	12 = M	32 = L				
	15 = L	44 = L				
	59 = M	80 = L				
	21 = M					
TOTAL SEVERITY L	51	235				
M	92					
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	2.9	L	5
7	5.3	M	19
10	13.6	L	19
DEDUCT TOTAL			43
CORRECTED DEDUCT VALUE (CDV)			32

PCI = 100 - CDV = 68

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 33
SECTION F-15
DATE AUG 27, 1986
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Carrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:

	EXISTING DISTRESS TYPES					
TOTAL SEVERITY L						
M						
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
DEDUCT TOTAL			
CORRECTED DEDUCT VALUE (CDV)			

PCI = 100 - CDV =

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

AGGREGATE SEAL RECENTLY PERFORMED; DO NOT USE THIS FORM.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH 114
SECTION F-16
DATE 8/26/86
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

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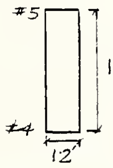

EXISTING DISTRESS TYPES

	10	15	9			
	121'=L	117×1.5'=L	100'=L			
	43'=L	117×1.5'=M				
TOTAL SEVERITY L	121	175.5	100			
M	43	175.5				
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
9	7.1	L	9
10	8.6	L	15
10	3.1	M	17
15	12.5	L	29
15	12.5	M	47
DEDUCT TOTAL			117
CORRECTED DEDUCT VALUE (CDV)			61

PCI = 100 - CDV = 39

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 27

SECTION F-17

DATE AUG 28, 1986

SAMPLE UNIT

SURVEYED BY LINDLY

AREA OF SAMPLE

Distress Types

1. *Alligator Cracking*
2. *Bleeding*
3. *Block Cracking*
*4. *Bumps and Sags*
5. *Carrugation*
6. *Depression*
*7. *Edge Cracking*
*8. *Jt Reflection Cracking*
*9. *Lane/Shldr Drop Off*
*10. *Long & Trans Cracking*
11. *Patching & Util Cut Patching*
12. *Polished Aggregate*
*13. *Potholes*
14. *Railroad Crossing*
15. *Rutting*
16. *Shoving*
17. *Slippage Cracking*
18. *Swell*
19. *Weathering and Raveling*

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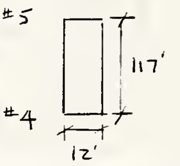

EXISTING DISTRESS TYPES

	10					
	104 = L					
	13 = M					
	2 = M					
	48 = L					
TOTAL SEVERITY L	152					
TOTAL SEVERITY M	15					
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	10.8	L	18
10	1.0	M	9
DEDUCT TOTAL			27
CORRECTED DEDUCT VALUE (CDV)			20

PCI = 100 - CDV = 80

RATING =

All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 31

SECTION F-18

DATE Aug 25, 1986

SAMPLE UNIT

SURVEYED BY LINDLY

AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

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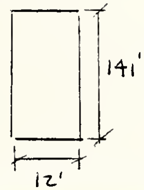


EXISTING DISTRESS TYPES

	7	12	10	15		
	141 = L	141 × 8 = L	282 = M	2×1×141 = L		
			76 = L			
			33 = L			
TOTAL SEVERITY L	141	1128	109	282		
M			282			
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	8.3	L	10
12	66.6	L	14
10	6.4	L	13
10	16.7	M	37
15	16.7	L	33
DEDUCT TOTAL			107
CORRECTED DEDUCT VALUE (CDV)			56

PCI = 100 - CDV = 44

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 1
DATE 8/28/86
SURVEYED BY LINDLY
SECTION F-19
SAMPLE UNIT
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:

EXISTING DISTRESS TYPES

TOTAL SEVERITY L						
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
DEDUCT TOTAL			
CORRECTED DEDUCT VALUE (CDV)			

PCI = 100 - CDV =

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

RECENTLY AGGREGATE SEALED.
DO NOT USE THIS FORM.

FORM B

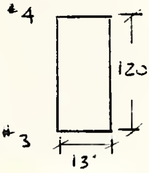
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 8
SECTION L-10
DATE SEP 4, '86
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

		10	2	11	15		
		9 = L	7x120 = M	1.5x120 = L	2x30 = L		
		4 = M			1/2x120 = M		
		77 = L			1.33x120 = M		
TOTAL SEVERITY	L	86		180	60		
	M	4	840		220		
	H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	5.5	L	12
10	0.26	M	2
2	53.8	M	29
11	11.5	L	17
15	3.8	L	18
15	14.1	M	49
DEDUCT TOTAL			127
CORRECTED DEDUCT VALUE (CDV)			66

PCI = 100 - CDV = 34

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 8
SECTION L-11
DATE SEPT. 4, '86
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:

EXISTING DISTRESS TYPES

TOTAL SEVERITY L						
M						
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
DEDUCT TOTAL			
CORRECTED DEDUCT VALUE (CDV)			

PCI = 100 - CDV =

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

AGGREGATE SEAL 1 YEAR AGO
DO NOT USE THIS FORM.

FORM B

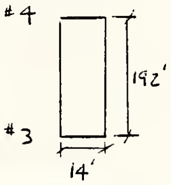
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 421
SECTION L-12
DATE SEP 4, 1986
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10	7				
	36 = L 59 = L	34 = L				
TOTAL SEVERITY L	95	34				
M						
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	3.5	L	3
7	1.3	L	8
DEDUCT TOTAL			11
CORRECTED DEDUCT VALUE (CDV)			11

PCI = 100 - CDV = 89

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH 14 SECTION L-13
DATE 8/26/86 SAMPLE UNIT
SURVEYED BY LINDLY AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:

EXISTING DISTRESS TYPES

TOTAL SEVERITY L						
M						
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
DEDUCT TOTAL			
CORRECTED DEDUCT VALUE (CDV)			

PCI = 100 - CDV =

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

RECENTLY AGGREGATE SEALED,
DO NOT USE THIS FORM.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 421 SECTION L-14

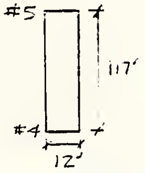
DATE SEPT. 5 '86 SAMPLE UNIT

SURVEYED BY LINDLY AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	7	10	1	15	19	
	39 = L	117 = L	16ft² = L	15'×11.7' = L	1'×100' = L	
		31 = L	7ft² = L			
		117 = L				
		25 = L				
TOTAL SEVERITY L	39	290	23	146.25	100	
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	2.8	L	5
10	20.6	L	24
1	1.6	L	14
15	10.4	L	28
19	7.1	L	4
DEDUCT TOTAL			75
CORRECTED DEDUCT VALUE (CDV)			48

PCI = 100 - CDV = 52

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 10 SECTION L-15

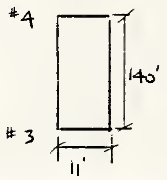
DATE SEP 5, 1986 SAMPLE UNIT

SURVEYED BY LINDLY AREA OF SAMPLE

Distress Types

- 1. Alligator Cracking
- 2. Bleeding
- 3. Block Cracking
- *4. Bumps and Sags
- 5. Corrugation
- 6. Depression
- *7. Edge Cracking
- *8. Jt Reflection Cracking
- *9. Lane/Shldr Drop Off
- *10. Long & Trans Cracking
- 11. Patching & Util Cut Patching
- 12. Polished Aggregate
- *13. Potholes
- 14. Railroad Crossing
- 15. Rutting
- 16. Shoving
- 17. Slippage Cracking
- 18. Swell
- 19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

		10	7	1			
		16 = M	32 = M	8 Ft² = L			
		31 = L		13 Ft² = M			
		19 = M					
		4 = L					
		31 = L					
		10 = M					
		7 = L					
		6 = M					
TOTAL SEVERITY	L	73		8			
	M	51	32	18			
	H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	4.7	L	10
10	3.3	M	18
7	2.1	L	4
1	0.5	L	6
1	1.2	M	23
DEDUCT TOTAL			61
CORRECTED DEDUCT VALUE (CDV)			33

PCI = 100 - CDV = 67

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

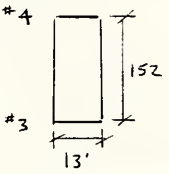
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 114
SECTION L-16
DATE SEP 5, 1986
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	7	10	10	10	12	1
	25 = L	42 = M	18 = L	24 = L	5×152 = L	12×1 = L
	55 = M	8 = L	16 = L	12 = L		
	16 = L	17 = M	4 = M	15 = M		
	24 = L	14 = L	35 = L	26 = M		
		26 = L	9 = M	22 = L		
		8 = M	7 = L	4 = M		
		8 = L	27 = L	8 = M		
		13 = M	4 = M	13 = L		
TOTAL SEVERITY L	65	56	103	71	760	12
TOTAL SEVERITY M	55	80	23	47		
TOTAL SEVERITY H						

15
1/2×152 = L
76

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	3.3	L	5
7	2.8	M	14
10	11.6	L	18
10	7.6	M	27
12	38.5	–	9
1	0.6	L	8
15	3.8	L	18
DEDUCT TOTAL			99
CORRECTED DEDUCT VALUE (CDV)			49

PCI = 100 − CDV = 51

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 10
SECTION L-17
DATE SEP. 5, '86
SAMPLE UNIT
SURVEYED BY LINDLY
AREA OF SAMPLE

Distress Types

- 1. Alligator Cracking
- 2. Bleeding
- 3. Block Cracking
- *4. Bumps and Sags
- 5. Corrugation
- 6. Depression
- *7. Edge Cracking
- *8. Jt Reflection Cracking
- *9. Lane/Shldr Drop Off
- *10. Long & Trans Cracking
- 11. Patching & Util Cut Patching
- 12. Polished Aggregate
- *13. Potholes
- 14. Railroad Crossing
- 15. Rutting
- 16. Shoving
- 17. Slippage Cracking
- 18. Swell
- 19. Weathering and Raveling

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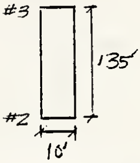


EXISTING DISTRESS TYPES

	7	10	9			
	56 = L	10 = L	122′ = L			
		8 = M				
		7 = L				
		21 = L				
TOTAL SEVERITY L	56	38	122			
TOTAL SEVERITY M		8				
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	4.1	L	6
10	2.8	L	7
10	0.6	M	5
9	9.0	L	11
DEDUCT TOTAL			29
CORRECTED DEDUCT VALUE (CDV)			12

PCI = 100 - CDV = 84

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

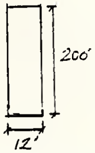
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ____________
SECTION S-8
DATE 8/7/86
SAMPLE UNIT ____________
SURVEYED BY Gupta, Lindly
AREA OF SAMPLE ____________

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	9					
	200=L					
TOTAL SEVERITY L	200					
M						
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
9	8.3	L	10
DEDUCT TOTAL			10
CORRECTED DEDUCT VALUE (CDV)			10

PCI = 100 - CDV = 90

RATING = ____________

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

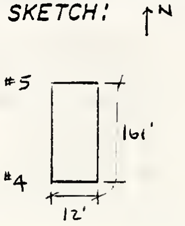
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ____________ SECTION S-9
DATE AUG 8, 1986 SAMPLE UNIT ____________
SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE ____________

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	7	10	10	9	10	
	145 = M	3 = L	5 = M	161 = L	2 = L	
		25 = M			9 = M	
		14 = L			5 = M	
		4 = M			2x161 = L	
		7 = L				
		11 = L				
		5 = M				
		13 = L				
TOTAL SEVERITY L		48		161	324	
TOTAL SEVERITY M	145	34	5		14	
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	7.5	M	22
10	19.3	L	23
10	2.7	M	16
9	8.3	L	10
DEDUCT TOTAL			71
CORRECTED DEDUCT VALUE (CDV)			40

PCI = 100 - CDV = 60

RATING = ____________

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ______

SECTION S-10

DATE 8/8/86

SAMPLE UNIT ______

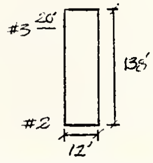
SURVEYED BY Gupta, Lindly

AREA OF SAMPLE ______

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

		10	15				
		138 = L	1 < 138 = L				
		23 = L					
		8 = L					
TOTAL SEVERITY	L	169	138				
	M						
	H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	10.2	L	16
15	8.3	L	25
DEDUCT TOTAL			41
CORRECTED DEDUCT VALUE (CDV)			30

PCI = 100 - CDV = 70

RATING = ______

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

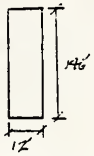
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ________
SECTION S-11
DATE 8/8/86
SAMPLE UNIT ________
SURVEYED BY GUPTA, LINDLY
AREA OF SAMPLE ________

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10					
	153=L					
	79=L					
	16=L					
	17=L					
TOTAL SEVERITY L	265					
M						
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	15.1	L	20
DEDUCT TOTAL			20
CORRECTED DEDUCT VALUE (CDV)			20

PCI = 100 - CDV = 80

RATING = ________

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

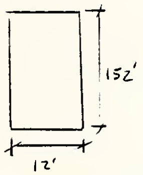
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ____________
SECTION S-12
DATE Aug 7, 1986
SAMPLE UNIT ____________
SURVEYED BY ____________
AREA OF SAMPLE ____________

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	7	10				
	29 = L	46 = L				
TOTAL SEVERITY L	29	46				
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
7	1.6	L	3
10	2.5	L	6
DEDUCT TOTAL			9
CORRECTED DEDUCT VALUE (CDV)			9

PCI = 100 - CDV = 91

RATING = ____________

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

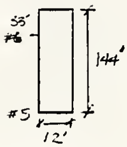
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH
SECTION S-13
DATE 8/8/86
SAMPLE UNIT
SURVEYED BY Gupta, Lindly
AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10	10	15			
	79=L	4=M	1×144 L			
	12=M	4=L				
	12=M					
	4=L					
	5=M					
	4=M					
	16=L					
	4=L					
TOTAL SEVERITY L	115	4	144			
TOTAL SEVERITY M	21	4				
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	6.9	L	14
10	1.5	M	11
15	8.3	L	26
DEDUCT TOTAL			51
CORRECTED DEDUCT VALUE (CDV)			32

PCI = 100 - CDV = 68

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

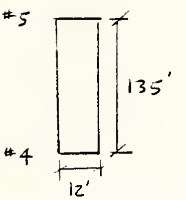
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ____________ SECTION S-14
DATE Aug 8, 1986 SAMPLE UNIT ____________
SURVEYED BY Gupta, Lindly AREA OF SAMPLE ____________

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10	1	15			
	7=L	1x123=M	1x60=L			
	3=L	1x12=M	1x75=M			
	21=M					
	4=L					
	17=M					
	36=L					
	8=M					
TOTAL SEVERITY L	50		60			
TOTAL SEVERITY M	46	135	75			
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	3.1	L	7
10	2.8	M	16
1	8.3	M	44
15	3.7	L	13
15	13.0	M	46
DEDUCT TOTAL			131
CORRECTED DEDUCT VALUE (CDV)			68

PCI = 100 - CDV = 32

RATING = ____________

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

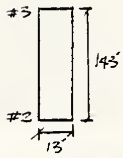
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ____________ SECTION S-15
DATE 8/7/86 SAMPLE UNIT ____________
SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE ____________

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10	10	7			
	35=L	50=L	7=M			
	15=L	47=L	7=L			
	53=L	11=M	23=M			
		3=M				
		13=L				
TOTAL SEVERITY L	103	110	7			
TOTAL SEVERITY M		14	30			
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	11.5	L	18
10	0.8	M	7
7	0.4	L	2
7	1.6	M	10
DEDUCT TOTAL			37
CORRECTED DEDUCT VALUE (CDV)			22

PCI = 100 - CDV = 78

RATING = ____________

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH ______ SECTION S-16

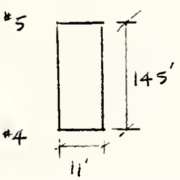
DATE Aug 11, 1986 SAMPLE UNIT ______

SURVEYED BY GUPTA AREA OF SAMPLE ______

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	9	10	15			
	27 = L	46 = L	1x80 = L			
		37 = L				
		9 = L				
		42 = L				
		12 = L				
TOTAL SEVERITY L	27	146	80			
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
9	1.7	L	3
10	9.1	L	16
15	5.0	L	21
DEDUCT TOTAL			40
CORRECTED DEDUCT VALUE (CDV)			30

PCI = 100 - CDV = 70

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

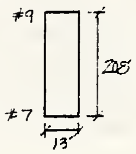
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 231
SECTION V-6
DATE 8/6/86
SAMPLE UNIT
SURVEYED BY Gupta, Lindly
AREA OF SAMPLE

Distress Types

- 1. Alligator Cracking
- 2. Bleeding
- 3. Block Cracking
- *4. Bumps and Sags
- 5. Corrugation
- 6. Depression
- *7. Edge Cracking
- *8. Jt Reflection Cracking
- *9. Lane/Shldr Drop Off
- *10. Long & Trans Cracking
- 11. Patching & Util Cut Patching
- 12. Polished Aggregate
- *13. Potholes
- 14. Railroad Crossing
- 15. Rutting
- 16. Shoving
- 17. Slippage Cracking
- 18. Swell
- 19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10	10	15	12		
	40=L	4=L	1×208=L	6×208		
	35=L	3=L				
	28=L	22=L				
	10=L	8=L				
		9=L				
		208=M				
TOTAL SEVERITY L	113	46	208	1248		
TOTAL SEVERITY M		208				
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	5.9	L	12
10	7.7	M	28
15	7.7	L	25
12	46.1	—	11
DEDUCT TOTAL			76
CORRECTED DEDUCT VALUE (CDV)			43

PCI = 100 - CDV = 57

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

ASPHALT PAVEMENT INSPECTION SHEET

BRANCH US 231 SECTION V-7

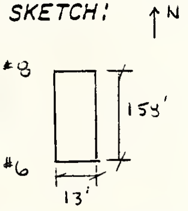
DATE AUG 6, 1986 SAMPLE UNIT ______

SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE ______

Distress Types

1. *Alligator Cracking*
2. *Bleeding*
3. *Block Cracking*
*4. *Bumps and Sags*
5. *Corrugation*
6. *Depression*
*7. *Edge Cracking*
*8. *Jt Reflection Cracking*
*9. *Lane/Shldr Drop Off*
*10. *Long & Trans Cracking*
11. *Patching & Util Cut Patching*
*12. *Polished Aggregate*
*13. *Potholes*
14. *Railroad Crossing*
15. *Rutting*
16. *Shoving*
17. *Slippage Cracking*
18. *Swell*
19. *Weathering and Raveling*

SKETCH:



EXISTING DISTRESS TYPES

		10	15	12			
		145 = L	1.5x158 = M	7x58			
		13 = M					
		4 = L					
		6 = L					
TOTAL SEVERITY	L	155		1106			
	M	13	237				
	H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	7.5	L	14
10	0.6	M	5
15	11.5	M	46
12	53.8	–	12
DEDUCT TOTAL			77
CORRECTED DEDUCT VALUE (CDV)			48

PCI = 100 - CDV = 52

RATING = ______

* *All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.*

FORM B

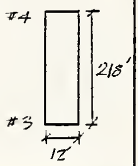
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH SR 154 SECTION V-8
DATE 8/5/86 SAMPLE UNIT
SURVEYED BY GUPTA, LINDLY AREA OF SAMPLE

Distress Types

1. Alligator Cracking
2. Bleeding
3. Block Cracking
*4. Bumps and Sags
5. Corrugation
6. Depression
*7. Edge Cracking
*8. Jt Reflection Cracking
*9. Lane/Shldr Drop Off
*10. Long & Trans Cracking
11. Patching & Util Cut Patching
12. Polished Aggregate
*13. Potholes
14. Railroad Crossing
15. Rutting
16. Shoving
17. Slippage Cracking
18. Swell
19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10	7	2			
	27=L	9=L	2x218 L			
	12=L					
	16=M					
	13=M					
	22=L					
	14=M					
TOTAL SEVERITY L	61=L	9=L	436=L			
M	43=M					
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	2.39	L	5
10	1.64	M	12
7	0.34	L	2
2	16.7	L	4
DEDUCT TOTAL			23
CORRECTED DEDUCT VALUE (CDV)			23

PCI = 100 - CDV = 77

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

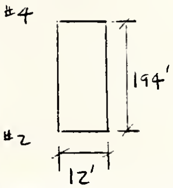
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH I-64
SECTION V-9
DATE AUG 15, 1986
SAMPLE UNIT
SURVEYED BY LINDLY / BARBOUR
AREA OF SAMPLE

Distress Types

1. Alligator Cracking	*10. Long & Trans Cracking
2. Bleeding	11. Patching & Util Cut Patching
3. Block Cracking	12. Polished Aggregate
*4. Bumps and Sags	*13. Potholes
5. Corrugation	14. Railroad Crossing
6. Depression	15. Rutting
*7. Edge Cracking	16. Shoving
*8. Jt Reflection Cracking	17. Slippage Cracking
*9. Lane/Shldr Drop Off	18. Swell
	19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	10	12	15			
	5=L	6'x194	388x2=M			
	8=M					
	50=L					
	5=M					
	54=L					
	10=M					
	66=L					
TOTAL SEVERITY L	175	1164	776			
M	18					
H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
10	7.5	L	14
10	0.8	M	7
12	50	L	12
15	33.3	L	41
DEDUCT TOTAL			74
CORRECTED DEDUCT VALUE (CDV)			42

PCI = 100 - CDV = 58

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

FORM B

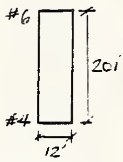
ASPHALT PAVEMENT INSPECTION SHEET

BRANCH I-64
SECTION V-10
DATE Aug 15. '86
SAMPLE UNIT
SURVEYED BY BARBOURE, LINDLY
AREA OF SAMPLE

Distress Types

- 1. Alligator Cracking
- 2. Bleeding
- 3. Block Cracking
- *4. Bumps and Sags
- 5. Corrugation
- 6. Depression
- *7. Edge Cracking
- *8. Jt Reflection Cracking
- *9. Lane/Shldr Drop Off
- *10. Long & Trans Cracking
- 11. Patching & Util Cut Patching
- 12. Polished Aggregate
- *13. Potholes
- 14. Railroad Crossing
- 15. Rutting
- 16. Shoving
- 17. Slippage Cracking
- 18. Swell
- 19. Weathering and Raveling

SKETCH:



EXISTING DISTRESS TYPES

	15					
	402×2=L					
TOTAL SEVERITY L	804					
TOTAL SEVERITY M						
TOTAL SEVERITY H						

PCI CALCULATION

DISTRESS TYPE	DENSITY	SEVERITY	DEDUCT VALUE
15	33.3	L	41
DEDUCT TOTAL			41
CORRECTED DEDUCT VALUE (CDV)			41

PCI = 100 - CDV = 59

RATING =

* All Distresses Are Measured In Square Feet Except Distresses 4,7,8,9 and 10 Which Are Measured In Linear Ft; Distress 13 Is Measured In Number of Potholes.

APPENDIX E - OVERLAY DESIGN GUIDE

This guide is written to assist the user in determining overlay thickness requirements for flexible pavements. The approach considers both the structural requirement (load-carrying ability) and a functional performance requirement (distress resistance). Of the two requirements, the greater thickness controls. In some cases, adequate structural capacity provides an opportunity for milling and recycling of pavements.

In applying the following procedures, several assumptions are made:

1. An on-site inspection has determined that an overlay is feasible.

2. A falling weight deflectometer (FWD) nondestructive test (NDT) device will be used to test the potential overlay site.

3. Adequate site repairs and preparation will precede the overlay.

4. Adequate materials and construction will be used for the overlay.

5. The overlay will not be placed on an unstable (rutted) pavement where new rutting would be quickly mirrored in the surface.

The guide is divided into five sections: background data and testing requirements, functional performance design, structural design, overlay thickness selection and potential for recycling, and an example.

BACKGROUND DATA AND TESTING REQUIREMENTS

Contact the Program Development Division of the IDOH to obtain the following data for the pavement to be overlaid:

1. Pavement cross-section. Asphalt and subbase thickness

   variability should be investigated. Note: this guide does not consider concrete pavements.
2. Traffic. Trucks per day

   (3 or more axles) during the overlay design life and total 18-kip equivalent single axle loads (ESAL) for the entire design life in both directions. These values should reflect a traffic growth factor as determined by Program Development Division to account for increased traffic over the design life.

Once the above information has been obtained, a graph depicting the variations in the data along the section should be developed. An example graph is provided in Figure E1. In this figure, a proposed overlay project has been divided into units of homogeneous cross-section, traffic, subgrade, and topography (hilly areas, river valleys, etc.). These units form the basis for further analysis.

Next, pavement cores and subgrade samples must be taken. If homogeneous units are longer than one mile in length, a minimum of two cores and borings should be made per mile. If units are less than one mile in length, a minimum of two cores and borings should be made per unit. Shelby tube samples of the subgrade should extend to a depth of at least two feet below the subbase. The particle size analysis and Atterberg Limits on the subgrade samples will allow the soil to be classified by either the AASHTO (AASHTO M 145-82) or the Unified (ASTM D 2487-85) soil classification systems. Figure E2 can then be consulted to estimate a reasonable value of CBR for the subgrade soil beneath each unit. However, future research may result in recommendations for tests that better define the subgrade properties. Pavement cores and boring logs must be examined to confirm layer thicknesses, including those of the subbase, throughout the unit. If necessary, units can be redefined.

Conduct non-destructive tests on each unit. If possible, perform FWD tests during the spring thaw, spring/fall wet periods, and summer to define the subgrade properties throughout the year. Conduct the FWD tests with a 9000 pound test load, which represents a dual-wheel truck load. Tests should be run in the right wheelpath of the outside driving lane. At this time the necessary data are deflections at 0 ft. (directly beneath the applied load) and at 7 ft. offset from load). A minimum of 10 readings per unit or 20 readings per mile should be taken. The following spacings are suggested:

Rolling Terrain......................	100 ft.
Numerous Cut-to-Fill Transitions....	100 ft.
Level Terrain.......................	250 ft.

At the site, pavement surface temperature should be recorded at least twice per testing session and at least twice per hour for longer sessions. An infrared gun-type device is recommended for ease of use. After testing has been completed, the mean air temperature during the five days prior to the day of testing should be determined. This is computed as the average of the sum of the maximum and minimum air temperatures of the five previous days. This data is available for most Indiana counties on a monthly basis in ´Climatological Data Indiana´ published by the ional Oceanic and Atmospheric Administration, National Climate Data Center, Asheville, N.C.. Unfortunately, the data is usually published several months after the end of the month in question.

Finally, enter field verified pavement data into computerized IDOH data base.

FUNCTIONAL PERFORMANCE DESIGN

A procedure is explained for determining the thickness of overlay asphalt necessary to maintain a functionally acceptable pavement for the overlay design life. A design equation was developed through a regression analysis of data collected throughout Indiana.

Given the inputs as previously determined, the required overlay thickness in inches is given by equation (E1).

$$\begin{aligned} \text{olay} = {} & 0.7592 + 0.00145(\text{tottrk})^2 + 0.00379(\text{age})^2 \qquad \text{(E1)} \\ & + 0.000162(\text{pci})^2 - 0.000429(\text{cbr})^2 \end{aligned}$$

where:
olay = calculated thickness of required, new overlay in inches

tottrk = total trucks {defined as (trucks/day in both directions) (overlay age) (365)/365,000} over the life of the overlay

age = design life of new overlay (years) 10 is normally specified

pci = desired PCI value at the end of the design life of the overlay (PCI is normally specified as 35, which approximates a PSI value of 2.5)

cbr = estimated subgrade CBR

Equation (E1) has been verified for the following range of design values:

1. Anticipated overlay age: 5-20 years
2a. Anticipated daily trucks: 50-3000

2b. Tottrk: less than 32.2
    Note: If tottrk exceeds 32.2, the calculated overlay value may exceed 3.0 inches. If so, 3.0 inches should be specified.
3. PCI: 35-65
4. CBR: 0-40%

Equation (E1) does not include provisions to vary overlay thickness "reliability." For example, a reliability of 95% means that the overlay will be successful 95 out of 100 times. Reliability relates to potential success of the overlay to provide service for the time period it is intended to last. The reliability for thickness designs using (E1) is approximately 50%: half the pavements will last longer than predicted; half will last shorter than predicted. If reliability greater than 50% is desired, add the following thicknesses to result from equation (E1) to attain the higher reliabilities.

Reliability (%)	Additional Thickness (in.)
95	0.9
90	0.7
85	0.6
75	0.4

Use of the additional thicknesses is not usually recommended because reliability-based design has not been tested in Indiana. However, for higher volume roads where high reliability may be desired, additional thickness should be considered.

STRUCTURAL DESIGN

A structural overlay design procedure is recommended based on procedures in the "AASHTO Guide for Design of Pavement Structures", 1986. A structural analysis is conducted for future traffic loads to determine if an overlay is needed to provide additional structural capacity. If an overlay is required, the thickness is determined.

A design life and P_t (terminal PSI) are required for the overlay analysis. Usually, design life is 10 years and p_t is 2.5.

The minimum required field deflections are the 0 ft. temperature corrected deflections (described below) and the 7 ft. uncorrected deflections measured in the summer. Additionally, the 7 ft. deflections from spring thaw and spring/fall wet seasons are desired.

Using the pavement surface temperature and 5-day mean air temperature, find a temperature correction factor for the 0 ft. deflections. The correction factor is determined by first summing the average pavement surface temperature during testing and the five day mean air temperature. With this sum, enter Figure E3 to find a mean asphalt temperature. Enter Figure E4 with the mean pavement temperature and find the deflection correction factor to be multiplied by the 0 ft. deflections to obtain the temperature corrected deflections.

Construct a graph similar to Figure E5 to determine pavement sub-units (further breakdown of homogeneous units) over which the deflections are relatively similar. For each of these sub-units, compute the 85th percentile deflection, which is defined as the mean plus 1.04 times the standard deviation of all temperature corrected 0 ft. deflections in that sub-unit. This value will be known as the 0 ft. design deflection for each sub-unit. With the design deflection values, calculate the required overlay thickness for each sub-unit. If thicknesses for the sub-units vary greatly, different overlay thicknesses may be required along the pavement length. The individual structural overlay thickness design procedure follows:

The structural capacity required for the overlay is determined in terms of the structural number (SN_{OL}) as

$$SN_{OL} = SN_Y - F_{RL}(SN_{XEFF}) \qquad (E2)$$

where:

SN_{OL} = the structural capacity of the overlay which must be added.

SN_Y = the total structural capacity required to support the overlay traffic over existing subgrade conditions (i.e. a new design).

SN_{XEFF} = the effective structural capacity of the existing pavement immediately prior to overlay.

F_{RL} = the remaining life factor which accounts for damage to the existing pavement as well as the desired degree of damage to the overlay at the end of the overlay traffic.

The components of equation (E2) are determined with the following procedure:

I. Find SN_Y -- use the nomograph in Figure E6. with the following steps.

1. Select desired level of reliability from Table E1
2. Select standard deviation of 0.35 (as recommended in AASHTO)
3. Total 18-kip EAL = 18-kip EAL over the overlay design life in one direction as provided by the Program Development Division (divide traffic in both directions by 2). If roadway is multi-lane, traffic may be distributed based on expected lane use.
4. Effective Roadbed Soil Resilient Modulus (M_R) is given by $M_R=(PS_F)/(D_RR)$ (E3)

where:

P = the NDT load in pounds at time of testing

S_F = the subgrade modulus prediction factor given by in terms of subgrade Poisson's Ratio (PR).

PR = .50 S_F=0.269
PR = .40 S_F=0.289
PR = .30 S_F=0.297

D_R = the measured NDT deflection (in.)

R = radial distance from the center of the load (in.)

a. Find M_R based on the above equation for each season in which testing was done using the deflections at 7 ft.

b. Use

Figure E7 to determine an effective M_R for the entire year. Interpolate for months in which M_R values are not known.

c. If deflections for more than one season are not available, use the modulus obtained from summer deflections

5. Design serviceability loss is generally

$4.5 - 2.5 = 2.0$

The SN value read from the bottom of the chart is SN_Y

II. Determination of SN_{XEFF}

Find SN_{XEFF} from the FORTRAN program listed at the end of this appendix. The program computes SN_{XEFF} based on an elastic layer theory equation from Appendix PP of the 1986 AASHTO Guide which relates temperature-corrected deflection directly under load to subgrade strength (calculated previously as M_R) and pavement strength (SN_{XEFF}). SN_{XEFF} can then be calculated because deflection and M_R are already known. An input file is required of which the first line is the number of SN_{XEFF} calculations to be made. Subsequent lines contain input data for each desired SNXEFF calculation and consists of the following items with a space between each item:

1. title (one word)
2. effective modulus of roadbed soil (psi)
3. poisson´s ratio of roadbed soil
4. thickness of pavement system above the roadbed soil (in.)
5. applied NDT load (lb.)
6. temperature-corrected deflection beneath load (mils/Klb).

III. Calculation of F_{RL} requires determining values for the following 3 intermediate variables before final calculation of F_{RL}: pavement condition factor C_X, remaining life value of the existing pavement R_{LX}, and remaining life value of the overlaid system after overlay traffic has been reached R_{LY}.

1. Find R_{LX}

   a. $C_X = SN_{XEFF}/SN_0$ (E4)

   where:

   SN_0 = the SN of the existing pavement when new and undamaged. (Currently, Indiana uses a composite layer coefficient for asphalt of $a_1 = 0.34$. The subbase layer coefficient is taken as $a_2 = 0.14$)

   SN_{XEFF} = calculated above

   b. With C_X, enter Figure E8 to find R_{LX}

2. Find $R_{LY} = (N_{FY}-Y)/(N_{FY})$ (E5)

   where:

   Y = design traffic (18-kip ESAL truck traffic in one direction in design lane) (same as I.3.)

N_{FY} = the number of 18-kip ESAL's to reduce the PSI from 4.5 to 2.0

To compute N_{FY}:

a. Using the same reliablity and standard deviation as determined in Steps I-1 and I-2, enter Figure E6 at the left and find the corresponding point on the first turning line.
b. Starting at the bottom of the grid at SN_Y, proceed upward to the $\Delta PSI=2.5$ curve and over to the left edge. This corresponds to a PSI drop from 4.5 to 2.0. Using the M_R established earlier, proceed to the second turning line.
c. The line connecting the points established on the turning lines passes through the value N_{FY}.

3. Use Figure E9 and the values of R_{LX} and R_{LY} to determine F_{RL}.

Now, with SN_Y, SN_{XEFF}, and F_{RL} known, SN_{OL} can be calculated from Equation (E2). The thickness of the asphalt overlay required to maintain structural adequacy can be determined by the equation: SN_{OL}/a_1 = inches of asphalt. The layer coefficient currently used in Indiana, a_1, is 0.34.

Note: A negative value of SN_{OL} indicates that the pavement does not require a structural overlay during the design period.

OVERLAY THICKNESS SELECTION AND POTENTIAL FOR MILLING AND RECYCLING

If both the structural and functional performance analyses yield positive values for required overlay thickness, the larger of the two values should be specified. However, Indiana experience shows that in most cases, a maximum overlay thickness of three inches will be satisfactory.

No structural overlay is required if structural overlay thickness is negative. In fact, the pavement should not fail structurally if ($SN_{OL}/0.34$) inches of asphalt are removed from the pavement. This situation presents the opportunity to mill and recycle the surface of the pavement instead of adding additional thickness.

The following is recommended if no structural overlay is required and milling is to be evaluated:

1. Do not mill a thickness exceeding the required functional performance overlay thickness.
2. The overlay may consist of a combination of recycled and/or new asphalt equal to the required functional performance overlay thickness.

The recommendations above are conservative because their net effect does not decrease the structural capacity of the pavement. If the designer is certain that the effective structural capacity far exceeds future requirements, he may mill a thickness exdeeding the functional performance thickness. However, recommendation #2 should not be violated because without required functional performance overlay, the pavement will deteriorate quickly and require another overlay before the end of the design period.

EXAMPLE

I Given:

1) A principal arterial road

2) Deflection testing performed once--in summer

3) Design life = 10 years, $p_t = 2.5$

4) In situ pavement structure from coring and subgrade classification

   11.2 inches asphalt

   4.8 inches subbase

   A-4 / SC subgrade

5) Trucks/day (3 or more axles; two directions) = 2175

   18-kip ESAL (over design life, two directions) = 3,100,000

6) 5-day mean air temperature = 72°F

7) Pavement surface temperature = 85°F

8) Raw data from field testing

   FWD load = 13.4 kips (not the 9 kip recommended load)

   FWD plate radius = 5.9 inches

   Design 0 ft. deflection = 0.03020 inches

   Design 7 ft. deflection = 0.00236 inches

II Functional performance overlay thickness.

1. Estimate CBR using Figure E2.

   Result: CBR = 14

2. Use Equation (E1) to calculate required

functional performance overlay where
CBR = 14, age = 10, pci = 35,
$$\text{tottrk} = \frac{(2175)(10)(365)}{365{,}000} = 21.75$$

Result: Olay = 2.0 inches

III Structural overlay

1. Find mean asphalt temperature. Do this by averaging temperatures at 3 depths within the asphalt layer found using Figure E3: 1" deep, mid-layer, and bottom of asphalt layer.

   Result: mean asphalt temperature = 77°F

2. Find temperature adjustment factor using Figure E4.

   Result: Adjustment factor = 0.93

3. Calculate temperature corrected 0 ft. design deflection

   Result: (0.93)(0.0302 in) = 0.0281 in.

4. Calculate M_R using Equation (E3)

   with: P = 13,400 lb., $S_F = 0.29$,
   D_R = .00236 inches, R = 84 inches

   Result: M_R = 19,600 psi

5. Calculate SN_y using Figure E6

   with: Reliability = 0.85, S.D. = 0.35,
   one-directional 18-kip ESAL = 1,550,000
   $\Delta PSI = 4.5 - 2.5 = 2.0$

   Result: $SN_Y = 2.4$

6. Calculate SN_{XEFF} from computer program
   with: M_R = 19,600
   $\mu = 0.35$
   pavement thickness = 16 inches
   load = 13,400 lb.
   deflection = .0281 in. or $\frac{28.1 \text{ mils}}{13.4 \text{ k-lb}} = 2.11$ mils/k-lb

   Result: $SN_{XEFF} = 3.13$

7. Find F_{RL}:

$SN_o = a_1 D_1 + a_2 D_2$

where a_1 = asphalt layer coefficient
a_2 = subbase layer coefficient
D_1 = asphalt layer thickness
D_2 = subbase layer thickness

$SN_0 = (11.2)(0.34) + (4.8)(0.14) = 4.48$

From equation (E4), $C_X = 3.13/4.48 = 0.70$

From Figure E8, $R_{LX} = 8\%$

Calculate N_{FY} using same input as in step (5) except $\Delta PSI = 4.5 - 2.0 = 2.5$

Result: $N_{FY} = 1{,}700{,}000$ 18-kip EAL

$$R_{LY} = \left(\frac{1{,}700{,}000-1{,}550{,}000}{1{,}750{,}000}\right) = 9\%$$

From Figure E9, $F_{RL} = 0.61$

8. From Equation (E2),
$SN_{OL} = 2.4 - (0.61)(3.13)$
$= 0.49$

9. Required structural overlay = 0.49/0.34 = 1.45 inches

IV. Recommend overlay thickness.

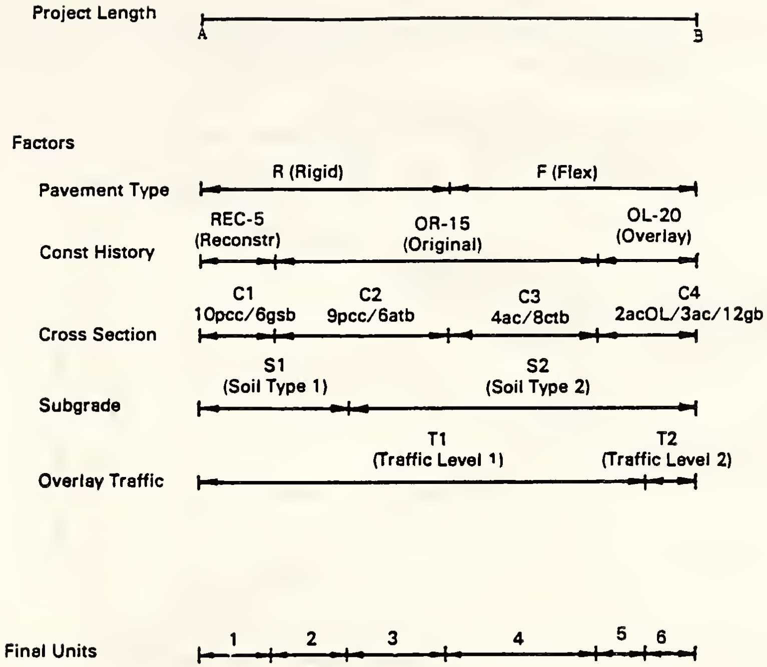
2.0 inches > 1.45 inches,

Therefore,
2.0 inch functional overlay controls.

Table E1. Reliability Values.

Functional Classification	Recommended Level of Reliability	
	Urban	Rural
Interstate and other freeways	85 - 99.9	80 - 99.9
Principal Arterials	80 - 99	75 - 95
Collectors	80 - 95	75 - 95
Local	50 - 80	50 - 80

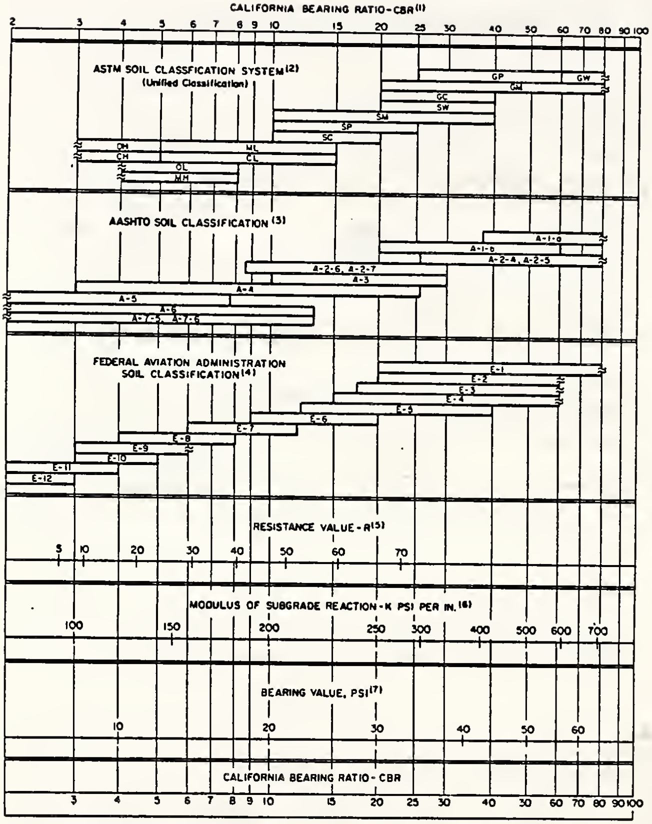
Note: Results based on a survey of the AASHTO Pavement Design Task Force



Unit Attributes:

Unit No.	1	2	3	4	5	6
Pavement type	R	R	R	F	F	F
Construction Hist	REC-5	OR-15	OR-15	OR-15	OL-20	OL-20
Cross Section	C1	C2	C2	C3	C4	C4
Subgrade	S1	S1	S2	S2	S2	S2
Overlay Traffic	T1	T1	T1	T1	T1	T2

Figure E1. Determination of Pavement Units.



(1) For the basic idea, see O. J. Porter, "Foundations for Flexible Pavements," Highway Research Board *Proceedings of the Twenty-second Annual Meeting*, 1942, Vol. 22, pages 100-136.

(2) ASTM Designation D2487.

(3) "Classification of Highway Subgrade Materials," Highway Research Board *Proceedings of the Twenty-fifth Annual Meeting*, 1945, Vol. 25, pages 376-392.

(4) *Airport Paving*, U.S. Department of Commerce, Federal Aviation Agency, May 1948, pages 11-16. Estimated using values given in FAA *Design Manual for Airport Pavements*.(Formerly used FAA Classification; Unified Classification now used.)

(5) C. E.Warnes, "Correlation Between *R* Value and *k* Value," unpublished report, Portland Cement Association, Rocky Mountain-Northwest Region, October 1971 (best-fit correlation with correction for saturation).

(6) See T. A. Middlebrooks and G. E. Bertram, "Soil Tests for Design of Runway Pavements," Highway Research Board *Proceedings of the Twenty-second Annual Meeting*, 1942, Vol. 22, page 152.

(7) See item (6), page 184.

Figure E2. Estimation of CBR.

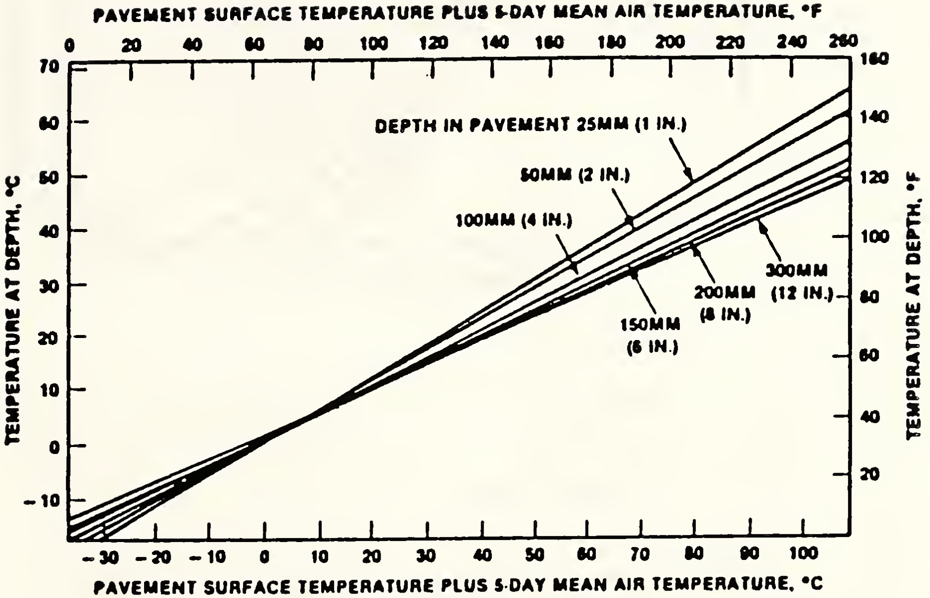
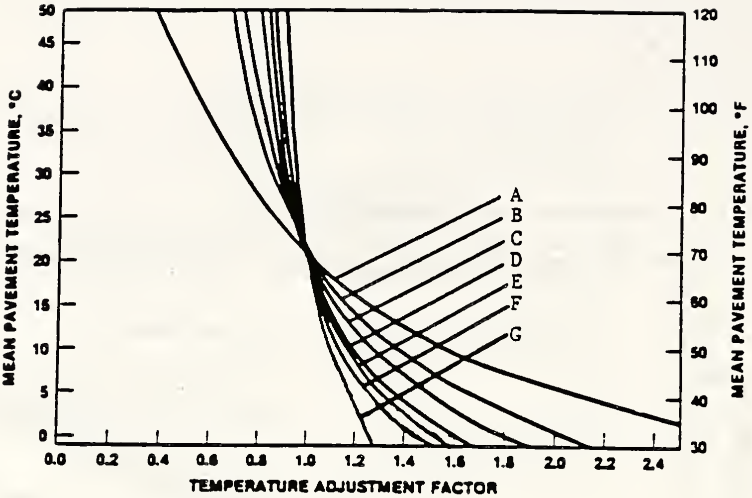


Figure E3. Estimation of Mean Asphalt Temperature.



Curve Identification

Base Material	Curve (Base Thickness)
Asphalt (Full Depth)	A (All Thicknesses)
Asphalt (Deep Strength)	B (4" of granular subbase) *
Portland Cement Concrete	G
Granular (Non Stabilized)	C(6"); D(12"); E(20"); F(25")
Cement Treated Base	
Sound	D(4"); E(8")
Cracked	C(4"); D(8")

(*) If more than 4" of granular material present use "Granular (Non Stabilized)" base material category

Figure E4. Temperature Adjustment Factor.

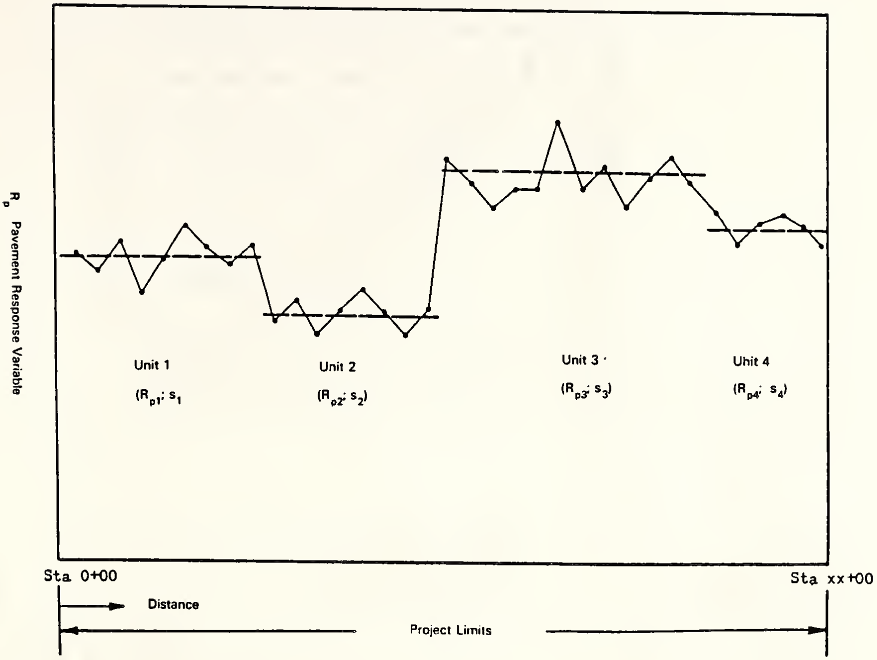
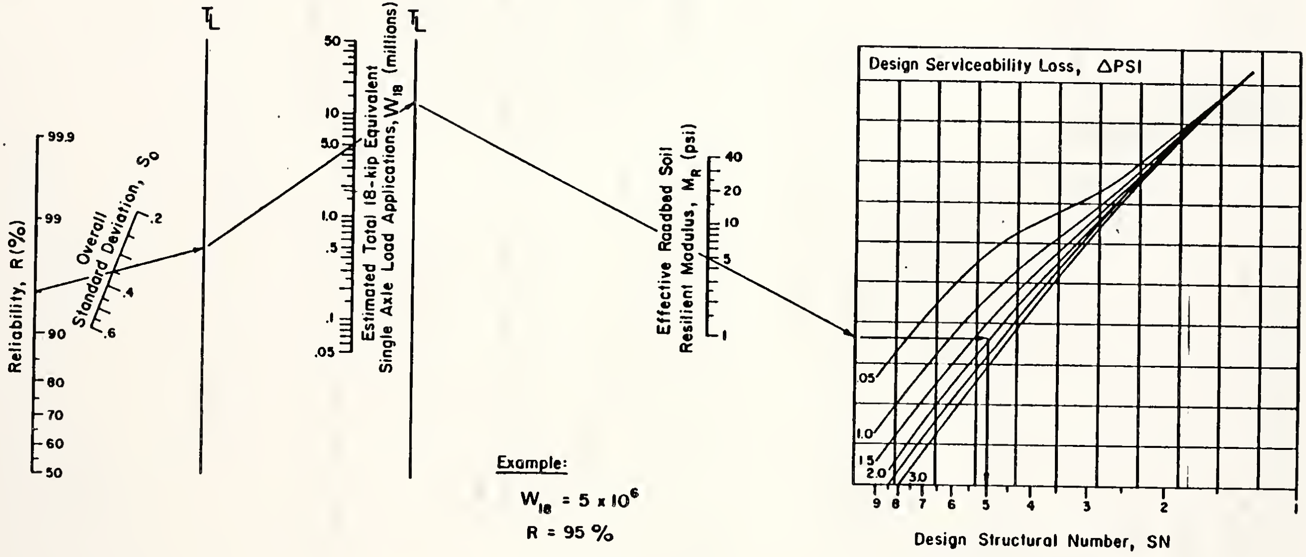


Figure E5. Determination of Pavement Sub-Units.

NOMOGRAPH SOLVES:

$$\log_{10} W_{18} = Z_R {*} S_o + 9.36 {*} \log_{10}(SN+1) - 0.20 + \frac{\log_{10}\left[\frac{\Delta PSI}{4.2 - 1.5}\right]}{0.40 + \frac{1094}{(SN+1)^{5.19}}} + 2.32 {*} \log_{10} M_R - 8.07$$



Example:

$W_{18} = 5 \times 10^6$

R = 95 %

$S_o = 0.35$

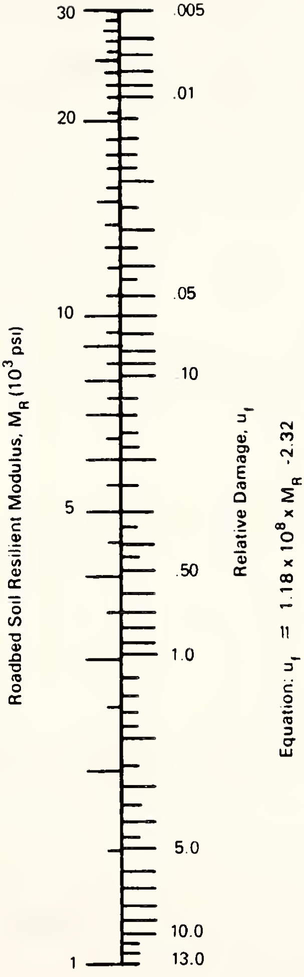
$M_R = 5000$ psi

ΔPSI = 1.9

Solution: SN = 5.0

Figure E6. AASHTO Nomograph for SN Determination.

Month	Roadbed Soil Modulus, M_R (psi)	Relative Damage, u_f
Jan.	20,000	0.01
Feb.	20,000	0.01
Mar.	2,500	1.51
Apr.	4,000	0.51
May	4,000	0.51
June	7,000	0.13
July	7,000	0.13
Aug.	7,000	0.13
Sept.	7,000	0.13
Oct.	7,000	0.13
Nov.	4,000	0.51
Dec.	20,000	0.01
Summation: Σu_f =		3.72



$$\bar{u}_f = \frac{\Sigma u_f}{n} = \frac{3.72}{12} = 0.31$$

Effective Roadbed Soil Resilient Modulus, M_R (psi) = 5,000 (corresponds to $\bar{u}_f$)

Figure E7. Determination of Effective M_R.

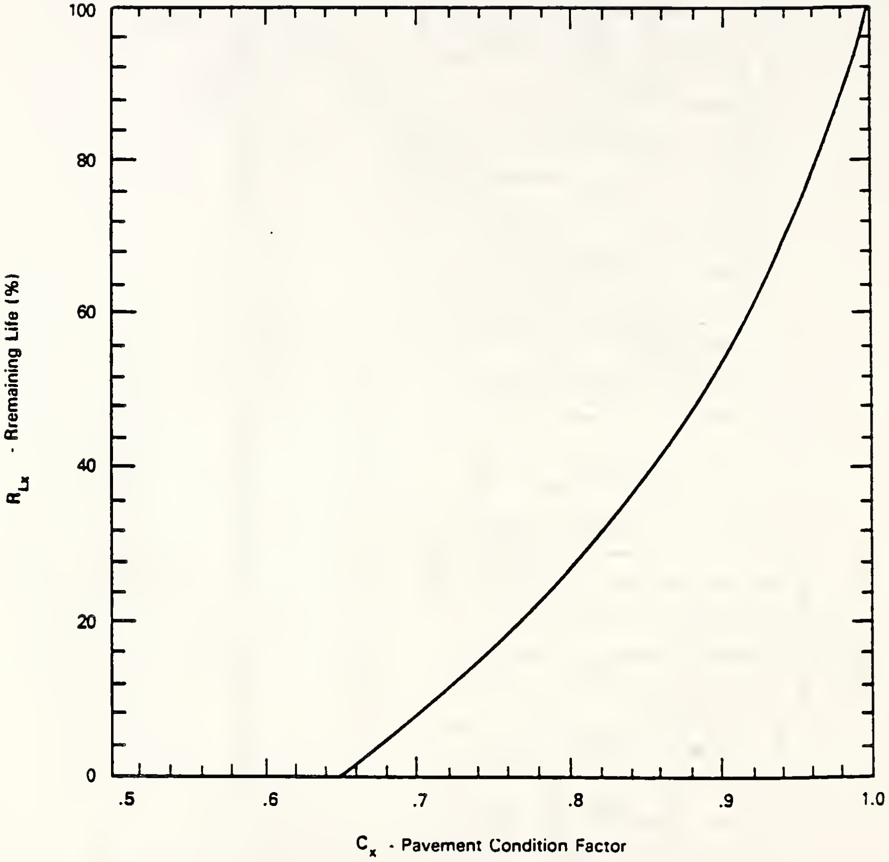


Figure E8. Determination of R_{LX}.

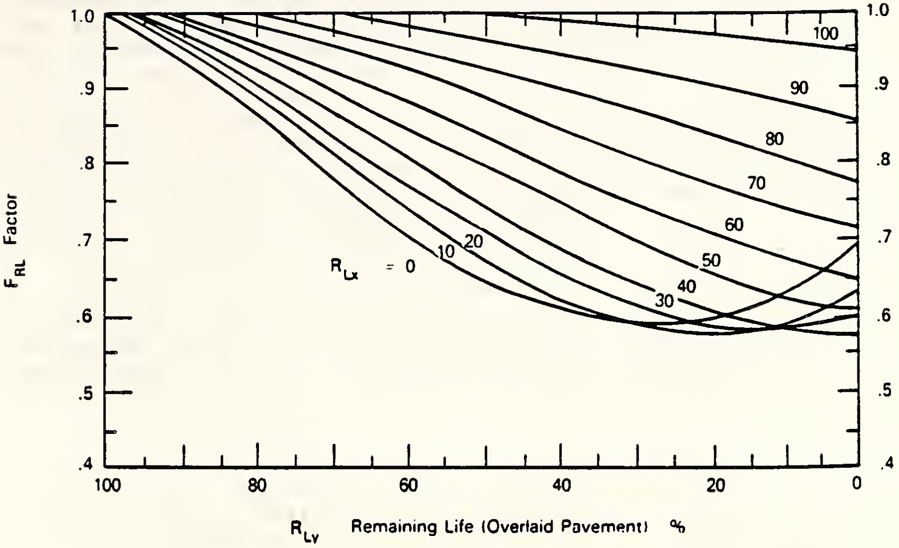


Figure E9. Determination of F_{RL}.

```
c This program calculates the effective structural
c number (sn) of a pavement based on equations from
c Appendix PP of the 1986 AASHTO Guide. It reads input
c from a file whose first line is the number of problems.
c Each subsequent line consists of: title; modulus of
c roadbed soil (psi); poisson´s ratio of roadbed soil;
c thickness of pavement system above the roadbed soil
c (in.); applied NDT load (lb.); deflection beneath load
c (mils/Klb). Input problems one to a line in free
c format. The program uses an iterative
c procedure to implicitly determine effective
c structural number. It is based on the assumption that
c if the SN assumed is too low, the deflection
c calculated will be higher than that actually
c recorded. Furthermore, the program assumes a single
c load applied through a single plate whose radius is
c 5.9 inches. This is the case with the FWD. Since sn
c started low, the theoretical deflection should be
c greater than the actual deflection until sn takes on
c a value large enough to make the theoretical deflection
c just less than the actual one. At this point stop
c iterating and print the results.

      character*10 title
      real p, ht, ac, sn, urs, ers, do, fb
      real increm, temp, parta, partb, diff
      integer j, numprobs, iter, maxiter
c The radius of the applied load for the FWD was
c 5.9 inches
      ac=5.9
c Structural Number (sn) will be incremented by
c 0.01 each loop
      increm=0.01
c The maximum number of iteration will be 1500
      maxiter=1500
      read*, numprobs
      do 10 j=1,numprobs
        read*, title, ers, urs, ht, p, do
c Convert deflection in mils/Klb to inches
        do= do*p/1000000
c Start with a very low sn and initialize number of
c iterations to 0
        sn=0.01
        iter=0
c Calculate deflection piecewise
  20    fb=((36161.5*(sn**2))/((ac**2)*
     & (ers**0.667))+1)**-0.5
        parta=2*p*((0.0043*ht)**3)/
     & (3.1416*ac*(sn**3))
        partb=1+fb*(((sn**3)*(1-(urs**2)))/
     & (ers*((0.0043*ht)**3))-1)
```

```
c Theoretical deflection is ´temp.´
      temp=parta*partb
c Since sn  started  low, the  theoretical  deflection
c should  be  greater  than  the actual  deflection  i
c until  sn takes on a  value large enough to make the
c theoretical deflection just less than the actual one.
c At this point stop  iterating and  print the results.
      diff=do-temp
      if (diff.gt.0) then
        goto 50
      endif
c Also, if  the number of  iterations  is too high, data
c is  probably  faulty and the program should be stopped.
c With  increm=0.01, this  corresponds to  an SN greater
c than 15.
      if (iter.gt.maxiter) then
        goto 50
      endif
c If sn is too low to give a satisfactory deflection
c value  and  iterations  are less than  the maximum,
c increment  sn by  ´increm´  and  iter  by 1.  Then
c re-calculate the theoretical deflection.
      iter=iter+1
      sn=sn+increm
      goto 20
c Print the results
  50  print*, title
      if (iter.gt.maxiter) then
      print*, ´Maximum number of iterations reached´
      endif
      print*, ´ ´
      print*, ´Ers = ´,ers
      print*, ´urs = ´,urs
      print*, ´ht  = ´,ht
      print*, ´P   = ´,p
      print*, ´do  = ´,do
      print*, ´ ´
      print(55), ´SN = ´, sn
  55  format (a7,f5.2)
      print*, ´ ´
      print*, ´ ´
      print*, ´ ´
c Continue and read in data for the next problem
  10  continue
      stop
      end
```

APPENDIX F - AASHTO GUIDE APPENDIX PP

PP.1 BACKGROUND

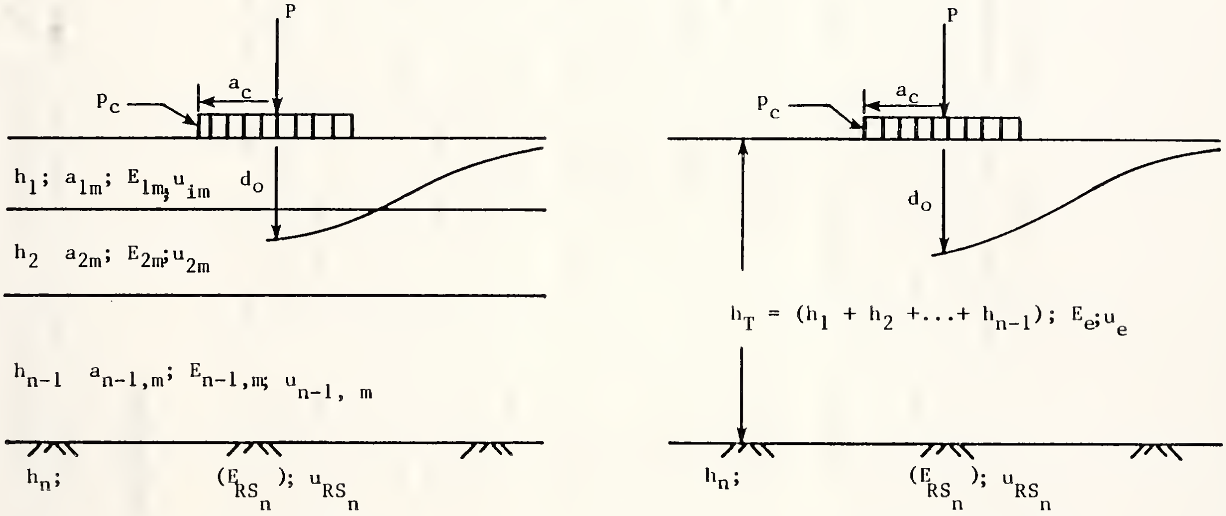
The Non-Destructive Testing (NDT) Method 2 analysis presented in Chapters 3 and 5 of Part III is based upon the maximum measured deflection from the dynamic NDT equipment and, as such, does not require a computerized analysis to back calculate layer moduli (E_i) as necessary in the NDT Method 1 approach. This method is to be used for the evaluation of flexible overlays constructed over existing flexible pavement systems.

In essence, this method uses the maximum NDT deflection, d_o, at the NDT load plate center and the roadbed soil modulus, E_{RS}, determined from the analysis of the deflection basin (outer geophone) presented in Chapter 5 of Part III and Appendix M to determine the in-situ or "effective" structural number, SN_{xeff}. The total pavement thickness, h_t, of all layers above the subgrade is also necessary in the solution sequence.

The purpose of this appendix is to present the analytical background development of the equations used to predict SN_{xeff} for a particular NDT device, maximum deflection and roadbed soil modulus. A typical set of SN_{xeff} predictive curves, developed for a variable load FWD impulse device (plate diameter 11.8 inches) is presented to illustrate how the equations can be used to develop similar curves applicable for any dynamic NDT device a user agency may have. Finally, an example problem is developed to illustrate how the particular set of curves can be used to predict the SN_{xeff} value.

PP.2 THEORETICAL DEVELOPMENT

Figure PP.1 illustrates a flexible pavement as a multi-layer elastic system, having layer characteristics of thickness, h_i, structural layer


P
a_c
P_c
h_1; a_{1m}; E_{1m}; u_{im}
d_o
h_2 a_{2m}; E_{2m}; u_{2m}
h_{n-1} $a_{n-1,m}$; $E_{n-1,m}$; $u_{n-1,m}$
h_n;
(E_{RS_n}); u_{RS_n}
P
a_c
P_c
d_o
$h_T = (h_1 + h_2 + \ldots + h_{n-1})$; E_e; u_e
h_n;
(E_{RS_n}); u_{RS_n}

(a) Actual Pavement

(b) Transformed Pavement

Figure PP.1. Equivalent transformed pavement philosophy.

coefficient, a_i, elastic modulus, E_i, and Poissons ratio, u_i. From Theo de Barros, the total pavement thickness, h_t, can be viewed as being comprised of a single equivalent transformed material of modulus, E_e.

The equivalent pavement modulus, E_e, can be expressed by:

$$E_e = \sum \frac{h_i}{h_t} * \left[\frac{E_i \ (1-u_e{}^2)}{(1-u_i{}^2)} \right]^{1/3} \qquad \text{(PP.1)}$$

For the conventional AASHO analysis, the structural number of a flexible pavement system is viewed as:

$$SN = \sum h_i a_i \qquad \text{(PP.2)}$$

If one considers a pavement layer material, of thickness h_{im} and quality a_{im}, differing from that of the same category material that was used at the AASHO Road Test (quality a_{is}), the equivalent thickness of the standard material, h_{es}, can be determined by equating the SN_i value of both materials:

$$h_{es} = \frac{a_{im}}{a_{is}} * h_{im} \qquad \text{(PP.3)}$$

An alternative form of this relationship is:

$$a_{im} = \frac{h_{es}}{h_{im}} * a_{is} \qquad \text{(PP.4)}$$

If one views both of these pavement layers (h_{im}; h_{es}) as having equal SN_i values, it can be concluede that the "stiffness" of both layers is also identical. Thus:

$$\frac{E_{im}\ h_{im}^{3}}{12\ (1-u_{im}^{2})} = \frac{E_{is}\ h_{es}^{3}}{12\ (1-u_{is}^{2})} \qquad (PP.5)$$

$$\frac{h_{es}^{3}}{h_{im}^{3}} = \frac{E_{im}\ (1-u_{is}^{2})}{E_{is}\ (1-u_{im}^{2})} \qquad (PP.6)$$

$$\frac{h_{es}}{h_{im}} = \left[\frac{E_{im}\ (1-u_{is}^{2})}{E_{is}\ (1-u_{im}^{2})}\right]^{1/3} \qquad (PP.7)$$

If it is assumed that for any given general material type category (i.e., granular material or asphaltic material), that u_{is} is equal to u_{im}, then:

$$a_{im} = a_{is} \left[\frac{E_{im}}{E_{is}}\right]^{1/3} \qquad (PP.8)$$

Based upon the following, for any given pavement structure comprised of pavement layers having different quality levels (a_i):

$$SN = \sum h_i a_{im} = \sum h_i a_{is} \left[\frac{E_{im}}{E_{is}}\right]^{1/3} \qquad (PP.9)$$

In lieu of using a relative standard material for each layer (i.e., a_{1s}, a_{2s}, a_{3s}, etc.), an arbitrary standard material having a layer coefficient can be selected (a_{ss}). For this condition:

$$a_{1s} = a_{ss} \left[\frac{E_{1s}\ (1-u_{ss}^{2})}{E_{ss}\ (1-u_{1s}^{2})} \right]^{1/3} \tag{PP.10}$$

$$a_{2s} = a_{ss} \left[\frac{E_{2s}\ (1-u_{ss}^{2})}{E_{ss}\ (1-u_{2s}^{2})} \right]^{1/3} \tag{PP.11}$$

$$\vdots$$

$$a_{ns} = a_{ss} \left[\frac{E_{ns}\ (1-u_{ss}^{2})}{E_{ss}\ (1-u_{ns}^{2})} \right]^{1/3} \tag{PP.12}$$

In general,

$$a_{is} = a_{ss} \left[\frac{E_{is}\ (1-u_{ss}^{2})}{E_{ss}\ (1-u_{is}^{2})} \right]^{1/3} \tag{PP.13}$$

or

$$SN = \sum h_i \, a_{ss} \left[\frac{E_{is} \, E_{im} \, (1-u_{ss}^{2})}{E_{ss} \, E_{is} \, (1-u_{is}^{2})} \right]^{1/3} \qquad \text{(PP.14)}$$

Since a_{ss} is a constant (once the material is selected as a standard),

$$SN = a_{ss} \left[\frac{(1-u_{ss}^{2})}{E_{ss}} \right]^{1/3} * \sum h_i \left[\frac{E_{im}}{(1-u_{is}^{2})} \right]^{1/3} \qquad \text{(PP.15)}$$

In Part II, Chapter 2 of this Guide, it is noted that the AASHO Road Test results for the crushed stone (granular base) are represented by:

$a_2 = 0.14$
$E_2 = 30{,}000$ psi

If these values are arbitrarily selected as the standard material, $a_{ss} = 0.14$; $E_{ss} = 30{,}000$ psi and letting $u_{ss} = 0.35$; then,

$$SN = 0.14 \left[\frac{(1-0.35^{2})}{30000} \right]^{1/3} * \sum h_i \left[\frac{E_i}{(1-u_i^{2})} \right]^{1/3} \qquad \text{(PP.16)}$$

or

$$SN = 0.0043 \sum h_i \left[\frac{E_i}{(1-u_i^{2})} \right]^{1/3} \qquad \text{(PP.17)}$$

Referring back to Figure PP.1, and substituting the equivalent pavement moduli expression for E_e into the equation above the SN, an expression can be developed that relates the E_e value as a function of the total pavement thickness and structural number. If it is assumed that u_e is equal to u_{RS} (roadbed soil), then:

$$E_e = \left[\frac{SN}{0.0043 * h_t}\right]^3 (1-u_{RS}^2) \qquad \text{(PP.18)}$$

As will be seen, this equation represents a very important result.

When one views the transformed pavement section of Figure PP.1, it can be seen that the original multi-layered pavement can be expressed as an equivalent two layer pavement structure having $E_1 = E_e$, $E_2 = E_{RS}$ (referred to as M_R in Part II), and $h_1 = h_t$. In addition, u_e can be selected to have any value, $u_1 = u_e = u_{RS}$. If a dynamic NDT device of known load, P, and plate radius, a_c, is placed on both systems, the maximum deflection, d_o, can be found from Burmeister's two layer deflection theory. This equation is:

$$d_o = \frac{2\, p_c\, a_c\, (1-u_{RS}^2)\, F_w}{E_{RS}} \qquad \text{(PP.19)}$$

The F_w parameter is called the Burmeister two layer deflection factor and is expressed by:

$$F_w = \frac{E_{RS}\,(1-u_e^2)}{E_e\,(1-u_{RS}^2)} + F_b \left[1 - \frac{E_{RS}}{E_e}\right] \qquad \text{(PP.20)}$$

In this equation, F_b is the Boussinesq one layer deflection factor and is given by:

$$F_b = \left[\left[1+\left[\frac{h_e}{a_c}\right]^2\right]^{.5} - \frac{h_e}{a_c}\right]\left[1 + \frac{(h_e/a_c)}{2(1-u_{RS})\left[1+(h_e/a_c)^2\right]^{.5}}\right] \quad \text{(PP.21)}$$

The term h_e is called the equivalent transformed thickness and is given by:

$$h_e = 0.9\, h_t \left[\frac{E_e\ (1-u_{RS}{}^2)}{E_{RS}\ (1-u_e{}^2)}\right]^{1/3} \quad \text{(PP.22)}$$

Substitution of the E_e equation into this expression leads to:

$$\frac{h_e}{a_c} = \frac{0.9\ SN}{0.0043\ a_c}\left[\frac{(1-u_{RS}{}^2)}{E_{RS}}\right]^{1/3}$$

$$= \frac{209.3\ SN}{a_c}\left[\frac{(1-u_{RS}{}^2)}{E_{RS}}\right]^{1/3} \quad \text{(PP.23)}$$

and

$$\left[\frac{h_e}{a_c}\right]^2 = \left[\frac{43806.5\ SN}{a_c^{\ 2}}\right]\left[\frac{(1-u_{RS}^{\ 2})}{E_{RS}}\right]^{2/3} \qquad \text{(PP.24)}$$

Finally, the Burmeister deflection equation can also be written in terms of the NDT plate laod, P, rather than plate pressure and rearranged to yield:

$$d_o = \left[\frac{2\ P\ (1-u_{RS}^{\ 2})}{3.1416\ a_c\ E_e}\right]\left[1 + F_b\left[\frac{E_e}{E_{RS}} - 1\right]\right] \qquad \text{(PP.25)}$$

Substitution of the E_e equation into the above results in:

$$d_o = \left[\frac{2\ P\ (0.0043*h_t)^3}{3.1416\ a_c\ SN^3}\right]\left[1 + F_b\left[\frac{SN^3\ (1-u_{RS}^{\ 2})}{E_{RS}\ (0.0043*h_t)^3} - 1\right]\right] \qquad \text{(PP.26)}$$

The equation for F_b as a function of h_e (which in itself is a function of SN, a_c, u_{RS}, and E_{RS}) has been previously defined.

From a functional viewpoint, the d_o equation can be described by:

$d_o = f_1$ (P, a_c, u_{RS}, E_{RS}, SN_{xeff}, and h_t)

This implies that:

$SN_{xeff} = f_2$ (P, a_c, u_{RS}, E_{RS}, h_t, d_o)

For a given dynamic NDT deflection device, both the dynamic load, P, and load plate radius, a_c, are constant. For a given pavement system, the measured deflection, d_o, on a pavement of total thickness, h_t, is only a function of the SN_{xeff} and the roadbed soil properties (E_{RS} and u_{RS}). As the value of u_{RS} can be accurately assumed and E_{RS} can be determined from the procedure presented in Part III, Chapter 5 and Appendix M, the effective structural number, SN_{xeff}, value can be directly estimated.

PP.3 DEVELOPMENT OF SN RELATIONSHIPS FOR A UNIQUE NDT DEVICE

As noted, the solution to obtain the in-situ structural capacity (SN_{xeff}) is a function of the particular load and load plate characteristics of the specific NDT deflection equipment used (steady state vibratory or impulse FWD). The final evaluation equation presented in the previous section is readily adaptable to either a computer or graphical analysis. Figure PP.2 represents a typical solution for a 10,000 pound FWD device, having a plate diameter of 11.8 inches ($a_c = 5.91$ inches).

The set of curves are developed for a range of support conditions (E_{RS}) and a total pavement thickness (h_t) of 10.0 inches. Similar curves for other h_t values can be established from the equations so that a family of E_{RS} and h_t curves can be established. Although the curves have been developed for a specific NDT dynamic load (P) of 10,000 pounds, the general assumption of linear elasticity implies that pavement deflection, d_o, is proportional to the dynamic load. As a result, the set of curves are really applicable to the entire range of dynamic loads used on a particular NDT device. This is accomplished by adjusting a measured deflection at any load P_j to the deflection that would occur at a load of 10,000 pounds.

For the curves shown in Figure PP.2, a u_{RS} of 0.5 has been assumed. When this value of Poisson's ratio is utilized, the equation for F_b is greatly simplified:

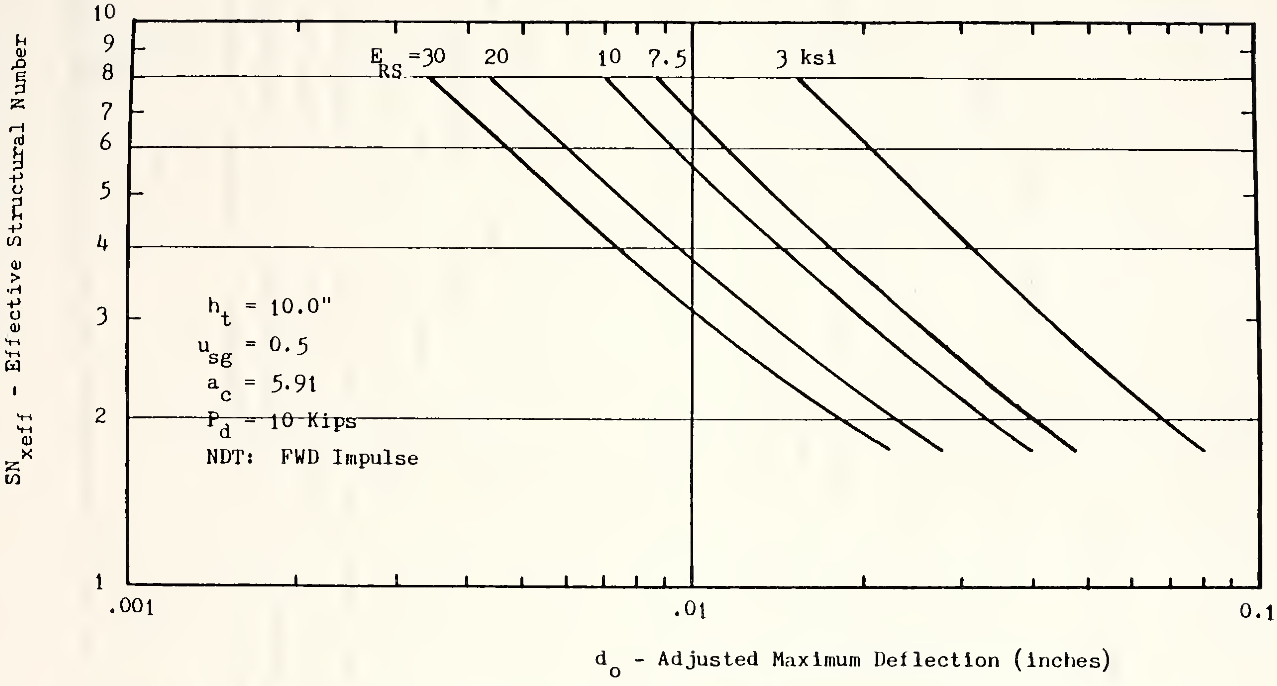


Figure PP.2. Effective structural number prediction curves based on maximum NDT Deflection.

$$F_b = \left[1 + \frac{36161.5\ SN_{xeff}^{2}}{a_c^{2}\ E_{RS}^{2/3}} \right]^{-1/2} \qquad \text{(PP.27)}$$

PP.4 EXAMPLE SOLUTION

One of the most important factors to remember when using the NDT Method 2 procedure (SN_{xeff} curves) is that the measured deflection, d_o, must be corrected to a standardized temperature condition in accordance with the method presented in Appendix L. This adjusted deflection is the value that is used to predict the SN_{xeff} value. However, equally important is the fact that the adjustment must not be accomplished until after the roadbed soil modulus value, E_{RS}, has been predicted from the original (unadjusted) deflection basin measurements.

An example to illustrate the use of the procedure is as follows:

Given:

An NDT deflection test is conducted on a flexible pavement structure comprised of a 3-inch asphalt surface course and a 7-inch asphalt base material. A Falling Weight Deflectometer is used to measure the deflection basin under a 10,000 pound load. The device uses a 11.8-inch diameter load plate. The average pavement temperature during the time of the test was found to be 95°F (from Appendix L). A maximum deflection of 0.019 inches was obtained during the test. An analysis of the outer geophone deflection indicated that the in-situ roadbed soil modulus at the time of the test was 20,000 psi (computed in accordance with Appendix M).

Find:

For this input data, determine the effective structural number of the existing pavement by NDT Method 2.

Solution:

For this problem:

P = 10 kips,
a_c = 5.91 inches, and
$h_t = h_1 + h_2$ = 10 inches.

Therefore, the NDT load-pavement thickness allows for the use of Figure PP.2. Referring to Figure L.3 (of Appendix L), the deflection-temperature adjustment factor, F_d, for full depth asphalt pavements at 95 °F is 0.63.

The adjusted d_o value is therefore:

$d_o(adj)$ = (0.19 inches) * 0.63 = 0.012 inches

For an in-situ roadbed soil modulus (E_{RS}) of 20,000 and an adjusted maximum deflection (d_o) of 0.012 inches, Figure PP.2 is used to determine that:

SN_{xeff} = 3.30

As a final point to this example problem, it should be recognized that the SN_{xeff} value is determined with the actual E_{RS} value at the time of the NDT test and with a temperature adjusted d_o value. For an eventual overlay analysis, the roadbed soil modulus value of 20,000 psi need not be the eventual design value as the designer must assess the annual environmental impact in accordance with procedures noted in Part II of this Guide. Nonetheless, the prediction of the SN_{xeff} value from NDT results must use the actual in-situ roadbed soil modulus at the time of the NDT test and not the eventual design value.

COVER DESIGN BY ALDO GIORGINI